

# **Identifying Leadership and Management Best Practices for Reducing Firefighter Deaths and Injuries**

## **Phase I Report**

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## Background

The National Fallen Firefighters Foundation (NFFF) in cooperation with the United States Fire Administration (USFA) is supporting the national goal to reduce firefighter fatalities by 25 percent within 5 years and by 50 percent within 10 years. The NFFF organized, urged other groups and associations to participate, and led a national summit and regional follow-up meetings focusing on the goal of firefighter fatality reduction. These meetings led to the design of a national line of duty death (LODD) implementation strategy. The “Everyone Goes Home” website (see [www.everyonegoeshome.org/summit.html](http://www.everyonegoeshome.org/summit.html)) reports:

The Summit marks a significant milestone, because it is the first time that a major gathering has been organized to unite all segments of the fire service behind the common goal of reducing firefighter deaths. It provided an opportunity for all of the participants to focus on the problems, jointly identify the most important issues, agree upon a set of key initiatives, and develop the commitments and coalitions that are essential to move forward with their implementation.

Oklahoma State University through Fire Protection Publications (FPP) participated in the National Firefighter Life Safety Summit in 2004. FPP is committed to conducting research that will directly influence the national line of duty death (LODD) initiatives to reduce firefighter deaths and injuries. This project is the first research endeavor by FPP to impact the LODD national strategies.

The principal purpose of this research project is to provide direct assistance to the fire service as it moves to reduce the costly and tragic number of firefighter deaths and injuries that occur annually in the United States. The project is designed to accomplish this goal by providing a list of exemplary practices that are the result of effective, safety-oriented leadership and management. In the United Kingdom, the academic literature calls these practices “good practices”; in the United States, they are called “best practices.” In this report we use the two terms synonymously. The project will also refine and extend the list of best practices based on evidence gathered from selected exemplary fire departments (called Alpha Departments) in Phase II of this research project. The research endeavor is conducted by Fire Protection Publications at Oklahoma State University with funding from the National Fallen Firefighters Foundation and the Public Entity Risk Institute (PERI).

## Hypothesis

The project hypothesis is that the current U.S. fire service culture must change and place a higher value on personnel safety in order to achieve the goal of reducing firefighter deaths and injuries. This shift in values can only be achieved through leadership. Fire service leaders must advocate and support firefighter safety. They must implement and enforce firefighter occupational safety and health policies and procedures through single-minded, forceful fire service management and supervisory practices. Technology, such as seat belts in emergency vehicles and geographic information system (GIS) based firefighter locator systems, has the potential to reduce firefighter deaths and injuries. These technological solutions will not be effective, however, unless the fire department organizational culture emphasizes risk assessment and places a high value on personnel safety.

## Project Goals

Phase I of this project required the generation of a core list of expert-derived managerial and leadership practices in the United States and in the United Kingdom that can mitigate firefighter line of duty deaths and injuries. These best practices have demonstrated, albeit in unique settings, that safety of fire department personnel can be improved through leadership and management efforts. The United States good practices list was compiled by querying leader experts from carefully selected United States fire-rescue departments and related organizations.

Phase I of the project also focused on the statistical fact that the annual rate of firefighter deaths in fire departments in the United Kingdom (England, Scotland, and Wales) is only one seventh of the United States rate, when corrected for the number of fires. United Kingdom fire department leader experts were assembled with assistance from the British Fire College and queried. A list of their best leadership and management practices was also compiled.

## The Expert Panels

A literature search and the field experiences of project staff led to the selection of a panel of safety-oriented United States and United Kingdom fire service leaders. These leaders constitute the United States Expert Panel and the United Kingdom Expert Panel. Project facilitators also attended the expert panels. The panel members were pre-briefed with background documentation and telephone discussions. Each person was aware of the United States fire service goal to reduce firefighter fatalities by 25 percent within 5 years and by

50 percent within 10 years. Each subject matter expert was eager to participate in the project. U.K. and U.S. expert panel members are listed in Appendix A, along with a list of other individuals who helped with the project.

## Literature Review

Space here does not allow for a lengthy discussion of the large literature focusing on line of duty deaths and injuries. Let it suffice to say that case studies of firefighter deaths conducted by the National Institute of Occupational Safety and Health (NIOSH; see <http://www.cdc.gov/niosh/about.html>) and the National Fire Protection Association (NFPA; <http://www.nfpa.org>) provide information concerning the causes of firefighter deaths. Similarly, a detailed analysis of firefighter injuries is found in a recent report entitled *The Economic Consequences of Firefighting Injuries and Their Prevention: Final Report (2004)* prepared by TriData Corporation for the National Institute for Standards and Technology (NIST).

We will note here that in 2004 of the total 103 firefighter deaths:

- 34% occurred while responding to or returning from alarms;
- 28% took place on the fireground;
- 17% were the result of “other on-duty” causes;
- 12% happened during training; and
- 9% occurred at non-fire emergencies (LeBlanc and Fahy, 2005: 48).

Of these deaths, three-fourths were the result of heart attacks (47 percent) and internal trauma (28%). The next two leading causes of death were crushing (8%) and asphyxiation (5%). “Stress or overexertion, which usually results in heart attacks or sudden cardiac events, continued to be the leading cause of fatal injury” (p. 48). Seventeen firefighters died in vehicle crashes in 2004. But, deaths due to vehicle crashes dropped by almost 50 percent between 2003 and 2004. Another eight firefighters died when vehicles struck them. In short, sudden cardiac events and vehicle-related accidents continue to be the major causes of firefighter deaths.

## Preliminary Best Practices Identification

The following lists of best practices for reducing firefighter deaths and injuries is compiled from NIOSH recommendations and the U.S. and U.K. expert panels. The list is preliminary and subject to review and modification as the larger research project progresses. Clearly, however, the list includes sound leadership and management practices focused on firefighter safety.

## NIOSH Recommendations

- Conduct pre-incident planning inspections to facilitate development of a safe fireground strategy.
- Review, revise where appropriate, implement, and enforce written standard operating guideline (SOGs) that specifically address incident command (IC) duties, emergency evacuation procedures, personnel accountability, rapid intervention teams and mutual aid operations on the fireground.
- Train on the SOGs, the incident command system, and lost firefighter procedures with mutual aid department to establish interagency knowledge of equipment, procedures, and capabilities.
- Ensure that the IC maintains the role of directing fireground operations for the duration of the incident or until the command role is formally passed to another individual.
- Ensure that the IC conducts a risk-versus-gain analysis prior to committing firefighters to the interior and continually assesses risk versus gain throughout the operations.
- Consider appointing a separate, but systemically integrated, incident safety officer.
- Ensure that all firefighters are equipped with radios capable of communicating with the IC.
- Ensure personnel accountability reports (PAR) are conducted in an efficient, organized manner and results are reported directly to the IC.
- Revise and enforce policies and guidelines regarding activation of personal alert safety system devices.
- Ensure that firefighters train with thermal imaging cameras and they are aware of their proper use and limitations, and ensure that firefighters are trained and aware of the hazards of exposure to carbon monoxide and other toxic fire gases (“Firefighter Fatality Summary,” 2004: 13).

## Best Practices Emerging from U.S. and U.K. Expert Panels

Listed below are the best practices as defined by participants at the U.S. Expert Panel held on 2 May 2005 in Oklahoma City, Oklahoma. The practices are organized into the six major domains emerging from the National Firefighter Life Safety Summit in 2004. These best practices are applicable in most instances to career, combination, and volunteer fire departments. In addition, for each domain, additional good practices identified at the U.K. Expert Panel held on 24 and 25 May 2005 at the Fire Service College in Moreton-in-Marsh are listed.

## Domains

### **I. Health, Fitness, and Wellness**

From the U.S. Panel:

- Establish and maintain a comprehensive health and wellness program for career personnel and modified for volunteers. Include medical exams plus physical and mental fitness components.
- Establish standard operating procedures and train for instances of terrorism, criminal acts, and civil unrest.
- Use a joint labor-management fitness planning committee.
- Adopt and enforce a no-smoking and no-tobacco policy.
- Adopt a zero-tolerance drug and alcohol policy appropriate to the type of department.
- Establish an annual job appropriate physical performance test.
- Identify existing medical pre-conditions of personnel, plus establish baseline physical profiles.
- Enforce proper use of safety clothing and equipment.
- Allow self-contained breathing apparatus (SCBA) removal only after Immediately Dangerous to Life and Health (IDLH) air sampling allows.
- Implement the United States Fire Administration model rehabilitation protocol for personnel.
- Appoint a physical fitness coordinator.
- When appropriate, encourage health club membership.
- Establish station exercise areas.
- Keep records of exposure to hazardous materials above and below allowable limits.
- Establish a critical incident stress debriefing and employee assistance program.
- Enforce the cleaning and decontamination of personal protective gear.

From the U.K. Panel:

- Include a lung capacity test as part of all medical exams, including entry exams.
- Require a health screening exam every three to five years up to age 40; an annual exam every year between the ages of 41 and 49; and an exam every six months after a firefighter reaches the age of 50.
- Require an annual physical fitness test.
- Allow for light duty personnel to be assigned by a shift commander

and approve return to operational duty only by permission of a physician.

- Require compulsory fitness programs.
- Require a health staffing conference before a firefighter is allowed to return to work after taking a stress leave.
- Limit a firefighter to four hours of incident work, require rehydration, and use energy bars for nutrition.
- Develop a policy that requires one day annual self-contained breathing apparatus retraining.
- Provide for the use of a mobile canteen support vehicle at protracted incidents.
- Based on a firefighter's eyesight exam, provide a prescription lens for their self-contained breathing apparatus mask.

## **II. Vehicle Safety**

In the area of vehicle safety, the Panel endorsed the National Volunteer Fire Council's ten-point model for vehicle safety, which is applicable to all types of fire departments. The points include the investigation of all accidents, a loss analysis, the identification of the responsible party, training and retraining of drivers and company officers, and related loss prevention practices. The Panel also endorsed the very detailed "Emergency Vehicle-Safety-Best Practice Assessment" model established by the Volunteer Firemen's Insurance Services, Inc. (VFIS) office, which is also applicable to all types of fire and rescue departments. This assessment consists of more than 50 detailed sub-areas, including available resources, under each of the eleven categories. The assessment includes "best practices" for drivers that focuses on the management of driver behavior through the enforcement of standard operating procedures, speed limitation policy, and an awards program.

In addition, the Panel identified the following best practices:

- Require the same training for career and volunteer personnel relative to vehicle operation.
- Strictly enforce the use of seat belts.
- Uniformly enforce vehicle safety-related rules.

Additional practices from the U.K. Panel:

- Mandate strict driver certification practices.
- Develop an effective training strategy for seat belt use.
- Remind operators that the possibility of litigation is ever present based

on not following vehicle safety policies and procedures.

- Use traffic incident analysis as a training device.
- Establish and differentiate response protocols for various types of alarms and dispatch.
- Provide special training for officers and others responding in cars and light trucks.
- Require that fire brigade standard operating procedures be followed with respect to traffic regulations when operating fire appliances and nonemergency compliance when in a private vehicle.

### **III. Prevention and Public Education**

From the U.S. Panel:

- Establish time goals for a business to reopen after various types of fires.
- Strengthen sprinkler ordinances.
- Establish fire-safe cigarette laws.
- Establish and manage citizen-service programs.
- Establish policies designed to minimize unnecessary building alarms.
- Establish pre-planning activities and improve pre-planning reviews and turn-around time for such reviews.
- Streamline code enforcement practices.
- Establish civil liability for preventable fires.
- Provide safety training to hotel, hospital, and “meeting place” employees.
- Encourage the development and use of public safety education programs

From the U.K. Panel:

- Prevent the use of dangerous buildings or occupancies.
- Emphasize prevention and public safety education as core values for firefighters.
- Develop and use the “Integrated Risk Management Plan” for all communities. Four detailed papers describing this methodology are available through the Public Entity Risk Institute (see <http://www.riskinstitute.org/peri/>).
- Restrict the use of dangerous lightweight construction.
- Intensify anti-arson efforts.
- Intensify policies and efforts to reduce unnecessary alarms.
- Establish community wide fire safety programs.
- Establish strategic public education partnerships.

- Develop “troublesome youth” programs.
- Work with police and other municipal workers to remove abandoned vehicles and structures.
- Develop special fire fighting training and management policies and procedures to deliver services to non-English speaking communities.

#### **IV. Training**

From the U.S. Panel:

- Use certified fire instructors.
- Develop a detailed recruitment manual.
- Validate recruitment and training programs.
- Provide live fire training for all recruits.
- Provide salary enhancements for advanced certifications.
- Ensure enforcement of training site safety.
- Require special certification(s) for live fire training instructors.
- Provide leadership and management education for chief officers.
- Encourage higher education for all firefighters.
- Training officers should be encouraged to join professional associations.

From the U.K. Panel:

- Do not burn abandoned buildings for training purposes.
- Conduct live fire training only at controlled facilities.
- Spend considerable training time on safety practices.
- Use pre-promotion training courses.
- Enforce rigorously a no “horseplay” policy and no hazing policy during training.
- Risk assessments should be conducted for all training exercises.

#### **V. Structural Fire Fighting**

From the U.S. Panel:

- Use crew resource management protocols.
- Mandate certified safety officers at all working incidents.
- Develop fire fighting procedures manuals for strategy and tactics for all types of fires.
- Require commanding officer training.
- Develop regional standardization and training for field operations.

- Ensure that all personnel are issued radios.
- Establish improved personnel accountability protocols.
- Prepare for all types of non-fire incidents.
- Mandate enforcement of safety philosophy and practice for structural fires.

From the U.K. Panel:

- Use control points for self-contained breathing apparatus entry into buildings.
- Do not allow the use of understaffed apparatus crews.
- Ensure that high-rise fire fighting operations do not begin until sufficient companies are on scene.
- Use nationally established standard operating procedures for generic risk assessments.
- Be sure that risks-versus-cost strategies are emphasized.
- Establish and enforce a “no self-dispatch” policy.
- Do not allow action on a pitched roof until the incident commander provides a safety/risk assessment.
- Require a risk and safety findings report after all large incidents.
- Require a performance review of Incident Command personnel after large incidents.

## **VI. Wildland Fire Fighting**

From the U.S. Panel:

- Ensure that all aircraft equipment meets high priority maintenance standards.
- Use only authorized personnel.
- Use large initial attack forces.
- Require special driver-operator training.
- Use only appropriate vehicles.
- Check communications and brief mutual aid crews before assignment.
- Check medical certification reciprocity for out-of-state ambulances.
- Integrate the wildland and structural crews in interface fires.
  
- Adopt the National Fire Plan (see [www.fireplan.gov/overview/whatis.html](http://www.fireplan.gov/overview/whatis.html)) for wildland areas.
- Provide joint training for urban-wildland interface situations.

From the U.K. Panel:

- Use high gain aerial photos and ordinance survey maps to control fire fighting units.
- Establish a private/public fund to pay for aerial support.

## **VII. Best Practices Applicable to All Six Domains**

- Investigate all injuries and sicknesses.
- Require safety-oriented training and education for all levels of management.
- Health and safety committees must be driven from the top down.
- The analysis of significant safety events needs widespread dissemination.
- Insurance carriers can offer important information and assistance.
- Risk/safety management applies to all fire department areas, not just operations, and requires appropriate policy and a strong leadership presence.

## **Obstacles to Success**

Expert panel members from both the U.S. and U.K. offered a number of obstacles to successful adoption, implementation, evaluation, and/or acculturation of the best practices above. The obstacles across the six domains include:

- There is a lack of accountability by decision makers to staff, fund, and support fire departments at appropriate levels.
- Fitness and physical requirements developed according to specific jobs and tasks indicating mandatory requirements do not exist.
- As a minimum standard, a physical exam should be required for fire personnel as recommended by the National Fire Protection Association (for those under 40 years old, every 3 yrs; for those 40 to 50 years of age, every 2 years) to identify cardiac problems.
- There is an inevitable resistance to change by staff.
- Firefighter occupational medical research is lacking.
- Combination departments must treat volunteers and career personnel the same relative to driving, accidents and approval to become “drivers.”
- There is a culture that “it will not happen to me,” therefore there is no need to wear my seatbelt. This culture is hard to change.
- Uniform enforcement of existing rules regulations and standards is lacking.
- A review of existing “harness” technologies is required to assess changing the way people are restrained in vehicles.
- Various lenient state laws and immunities prevent “stop at all red lights/signs” regulations from being implemented.

- There is a lack of sustained funding for training in specialty areas, such as hazardous materials and technical rescue.
- There is not enough interaction and training between wildland and structure fire fighting disciplines.

## Best Practices by Type of Fire Department

Members of the U.S. Expert Panel examined the list of best practices within the six domains and identified fire departments **that were known to panelists** to utilize these practices. The expert panels also assigned each best practice to the type of fire department—career paid, combination, or volunteer—for which the good practice would be most appropriate. It is important to note that the list of departments below is based on the knowledge of expert panelists. There are, of course, many other departments across the U.S. that employ best practices, but that were not mentioned by the experts.

### Career Paid Fire Department

A comprehensive health and wellness program	Chicago, IL
Bulletproof vest program. Vest issued to line personnel for civil unrest situations	Miami, FL; Pittsburgh, PA
EMS violence study	Chicago, IL
Implement the IAFF/IAFC Wellness Program. Includes physicals, mental and physical fitness, etc.	Miami-Dade County, FL; Phoenix, AZ; Fairfax, VA; Oklahoma City, OK; Chicago, IL
Zero alcohol tolerance policy, personnel must abstain from alcohol prior to duty	Louisville, KY
Performance test policy, firefighters must meet performance test annually to work on the line	Hialeah, FL
No smoking/tobacco employment policies	Alexandria, VA

Program to identify pre-existing medical conditions. Basic criteria established by worker compensation carriers/pools/funds, etc.	New Jersey State Fire Departments
Implement U.S. Fire Administration Rehabilitation Guide for Emergency Responders	Ponderosa, TX; Bloomington, MN; King of Prussia, PA; Frederick Co., MD VFD
Fire Department Fitness Instructor Certification	Oklahoma State University
Require air sampling prior to removal of SCBA	Phoenix, AZ; King of Prussia, PA
Safety equipment incentive policy; if safety equipment is not used, worker's compensation benefit to the firefighter is reduced by 25 percent	State of Florida
Comprehensive critical incident stress debriefing (CISD) and/or employee assistance program (EAP)	Pittsburgh, PA
Decontamination policy requires personal protective equipment decontamination twice per year	Las Vegas, NV; New York State Fire Departments
Mental stress assistance programs; increase safety by helping employees who have problems	Miami, FL; Miami-Dade, FL; Phoenix, AZ
<b>II. Vehicle Safety</b>	
Use a safe driver recognition program	Fairfax, VA
Maintain accident information records; install cameras in cabs; develop policies on traffic signals; use an Accident Investigation Unit	New York City FD; Phoenix, AZ
Automatic alcohol and drug testing following any vehicle accident	King of Prussia, PA; Norfolk, VA; New York City

Develop an Accident Liability Policy; the fire department driver assumes part of the damage costs	Atlanta, GA
Require emergency vehicle standards based on the age, mileage, and condition of vehicles as part of the labor contract	New York City
Vehicle safety policy that limits the number of occupants in a vehicle to the number of seatbelts in the vehicle	Phoenix, AZ; Miami, FL; New York City
Adopt the U.S. Fire Administration Emergency Vehicle Safety Initiative: (see <a href="http://www.usfa.dhs.gov/research/safety/vehicle.shtm">http://www.usfa.dhs.gov/research/safety/vehicle.shtm</a> )	
<b>III. <u>Prevention and Public Education</u></b>	
Loss control policy with the goal for commercial buildings back in operation in an average of two hours after the fire	Scottsdale, AZ
Multi-family dwellings sprinkler ordinances include all new four-family and existing four-family occupancies that are significantly renovated beginning in 1998	New York City
Require sprinklers based on square footage and new construction sites that are beyond certain distances from fire stations	Peoria, AZ
Citizen services programs such as “Connectors” and “Elder Links” that are designed for citizens to get the help they need from non-fire department services without using 911	Phoenix, AZ; Miami, FL; Miami-Dade, FL; Mesa, AZ
Nuisance alarm penalties that fine and bill alarm companies for transmitting non-emergency dispatches	Dothan, AL; Tulsa, OK; Las Vegas, NV
Use of electronic pre-fire plans received by units arriving on the scene through wireless transmissions	Chicago, IL; New York City; Las Vegas, NV
Fire company level preplanning and walk-through of buildings; with emphasis on target hazards	Miami, FL; Las Vegas, NV; New York City

State and local legislation prohibiting private use of fireworks	State of Arizona; State of New York; Miami, FL
Mark the outside of buildings with truss roofs for fire department	State of Arizona; State of New York; Miami, FL
Civil liability legislation for preventable fires	Dallas County, TX
Preplan system using placards with fire load, occupancy, and construction type	Kansas City, MO
Hotel life safety program that trains hotel staff about what to do prior to the arrival of the fire department	Las Vegas, NV
Hotel life safety education is part of hotel management curriculum for students at UNLV, which is delivered by the fire department	Las Vegas, NV
Fire prevention inspections in high-rise buildings conducted by FD station captains, the building fire warden, and a representative of the building owner. The inspection includes evacuation plans, occupants with disabilities, building controls for the HVAC, etc.	Houston, TX
<b>IV. Training</b>	
Manual and procedures for new firefighters include all aspects of physical fitness and hydration	Miami, FL
Ensure that the recruit training program is validated	Tulsa, OK
Provide live fire training to all firefighter recruits	Nassau County NY; New York City
Provide fire behavior and survival training to all firefighters	New York City
Public/private training center with strong safety oversight and controls	Overland Park, KS
Require certifications for live burn instructor and live burn master instructor	Florida Fire College (Ocala, FL)

Fire officer leadership development program similar to USFA Executive Fire Officer	State of Ohio
Carnegie-Mellon University has an interactive hazardous materials, scenario-based training for the U.S. Army and the New York City Fire Department.	New York City
Driver training simulators for chauffeurs/driver operators using virtual reality provided by NASCAR	Clark County, NV; New York City
Management Training and Leadership Center Program for supervision and operations	Phoenix, AZ
Fire Department Training Officers professional associations for sharing resources, networking, and professional development	States of Oregon, Florida, and Texas
<b><u>V. Structural Fire Fighting</u></b>	
Crew resource management (CRM) is under development. It is modeled after the aviation industry; it will be a guide for utilizing resources in structural firefighting based on incident type	Atlanta, GA
An Incident Safety Policy is in place. A Certified Safety Officer (CSO) is dispatched on all working fires; the CSO has complete authority to stop any and all operations	Miami, FL; Atlanta, GA; Las Vegas, NV; King of Prussia, PA; Prince George’s County, MD
Standard Operating Procedures through manuals and bulletins that define strategy, tactics for a variety of buildings such as private homes, office buildings, strip malls, apartments	New York City
Respiratory Protection Standard, 29 CFR 1910.134. (OSHA 2-in 2-out rule) mandated and regulations followed	State of Florida, Mesa, AZ; New York City
Command officer structural/tactical training for structural fire fighting	Phoenix, AZ; Freemont, CA,

Personnel accountability systems, including radios, for all personnel.

Las Vegas, NV;  
Pittsburgh, PA;  
Miami, FL;  
Phoenix, AZ;  
Mesa, AZ;  
Los Angeles, CA

Blue Card IC/command staff certification is required  
Require Fire Department Safety Officers Association certification program

Phoenix, AZ;  
Atlanta, GA

Comprehensive respiratory protection manual

Seattle, WA;  
Arlington County, VA

Adopt a Safety Philosophy such as:

- We will risk ourselves a lot within a structured plan, to save a savable life.
- We will risk ourselves a little, within a structured plan, to save savable property.
- We will not risk ourselves at all to save lives and property that are already lost

Phoenix, AZ; Mesa, AZ

Use electronic command boards

New York City

**IV. Wildland Fire Fighting**

Aircraft maintenance standards are high priority  
Response policy is to dispatch sufficient fire fighting resources for a successful initial attack

Aviation Division at  
Boise, Idaho;  
Los Alamos, NM

Driver/operator training programs for wildland response equipment

California Division of Forestry

Wildland vehicle policy; vehicles and equipment used for wildland fires need to be safe and appropriate to the task

Hanford, WA;  
Los Alamos, NM

Integration of command and control structures, both wildland team and structural incident command group must work together.

Los Alamos, NM;  
State of California

## Combination Fire Departments

### **I. Health, Fitness, and Wellness**

Program to identify preexisting medical conditions; basic criteria established by worker compensation carriers/pools/funds, etc.	New Jersey State
Fire Department Fitness Instructor Certification	Oklahoma State University
Safety equipment incentive policy; if proper safety equipment is not used, worker's compensation benefit to the firefighter is reduced by 25 percent	State of Florida
Implement U.S. Fire Administration Rehabilitation Guide for Emergency Responders	Ponderosa, TX; Bloomington, MN; King of Prussia, PA; Frederick Co., MD VFD
Air sampling is required prior to removal of self-contained breathing apparatus	Phoenix, AZ; King of Prussia, PA
Fire department hires physical fitness coordinator to work with career and volunteer members	Frederick County, MD
Records of hazardous material exposure kept for industrial firefighters	Los Alamos, NM
Comprehensive critical incident stress debriefing (CISD) and employee assistance programs (EAP)	Pittsburgh, PA
Require personal protective equipment decontamination twice per year	Las Vegas, NV; New York State Fire Departments
Mental stress assistance programs; increase safety by helping employees	Miami, FL; Miami-Dade, FL, Phoenix, AZ
<b><u>II. Vehicle Safety</u></b>	
Maintain accident information records; install cameras in cabs; develop policies on traffic signals; use an Accident Investigation Unit	New York City; Phoenix, AZ

Automatic alcohol and drug testing following any vehicle accident	King of Prussia, PA; Norfolk, VA; New York City FD
Vehicle safety policy that limits the number of occupants in the vehicle to the number of seatbelts in the vehicle.	Phoenix, AZ; Miami, FL; New York City FD
Adopt the U.S. Fire Administration Emergency Vehicle Safety Initiative: (see <a href="http://www.usfa.dhs.gov/research/safety/vehicle.shtm">http://www.usfa.dhs.gov/research/safety/vehicle.shtm</a> )	
<b>III. <u>Prevention and Public Education</u></b>	
Loss control policy, with the goal for commercial buildings being back in operation in an average of two hours after the fire	Scottsdale, AZ
Multi-family dwellings sprinkler ordinances, include all new four-family and existing four-family occupancies that have been significantly renovated beginning in 1998	New York City
Fire Safe Cigarette Law	State of New York
Require sprinklers based on square footage and new construction sites that are beyond certain distances from fire stations	Peoria, AZ
Citizen service programs such as “Connectors” and “Elder Links” programs are designed for citizens to get the help they need from non-fire department services without using 911	Phoenix, AZ; Miami, FL; Miami Dade, FL; Mesa, AZ
Nuisance alarm penalties that fine and bill alarm companies for transmitting non-emergency dispatches	Dothan, AL; Tulsa, OK; Las Vegas, NV
Geographic information system (GIS)-based pre-plan systems	Eveshem, NJ
Fire company level preplanning, with walk-through of buildings and with emphasis on target hazards	Miami, FL; Las Vegas, NV; New York City
State and local legislation prohibiting private use of fireworks	State of Arizona; New York State; Miami, FL

Mark the outside of buildings with truss roofs for fire department	New Jersey; Hatfield, PA
Civil liability legislation for preventable fires	Dallas County, TX
Pre-plan system using placards with fire load, occupancy, and construction type	Kansas City, MO
Hotel life safety program that trains staff about what to do prior to the arrival of the fire department	Las Vegas, NV
Hotel life safety education is part of hotel management curriculum for students at UNLV and is delivered by the fire department	Las Vegas, NV
Fire prevention inspections in high-rise buildings are conducted by FD station captains, the building fire warden, and a representative of the building owner; the inspection includes evacuation plans, occupants with disabilities, building controls for the HVAC, etc.	Houston, TX
<b>IV. Training</b>	
Manual and procedures for new firefighters includes all aspects of physical fitness and hydration	Miami, FL
Provide live fire training to all firefighter recruits	Nassau County NY; New York City
Use certification as a funding incentive for firefighters	State of Pennsylvania
Public/private training centers with strong safety oversight and controls	Overland Park, KS
Require certifications for live burn instructor and live burn master instructor	Florida Fire College (Ocala, FL)
Create Fire Department Training Officer professional associations; for sharing resources, networking, and professional development.	States of Oregon, Florida, and Texas

**V. Structural Fire Fighting**

Crew resource management (CRM) is under development; it is modeled after the aviation industry and will be used as a guide for utilizing resources in structural fire fighting based on incident type	Atlanta, GA
Incident Safety Policy; Certified Safety Officer (CSO) is dispatched on all working fires--the CSO has complete authority to stop any and all operations	Miami, FL; Atlanta, GA; Las Vegas, NV; King of Prussia, PA; Prince George's County, MD
Standard Operating Procedures through manuals and bulletins that define strategy, tactics for a variety of buildings such as private homes, office buildings, strip malls, apartments	New York City
Respiratory Protection Standard, 29 CFR 1910.134. (OSHA 2-in 2-out rule) mandated and regulations followed	State of Florida; Mesa, AZ; New York City
Develop personnel accountability systems, including radios for all personnel	Las Vegas, NV; Pittsburgh, PA; Miami, FL
Fire Department Safety Officers Association Certification Program is required.	Atlanta, GA
Develop vacant building fire fighting procedures, including building markings	New York City
Adopt a Safety Philosophy, such as: We will risk ourselves a lot within a structured plan, to save a savable life. We will risk ourselves a little, within a structured plan, to save savable property. We will not risk ourselves at all to save lives and property that are already lost	Phoenix, AZ; Mesa, AZ

**IV. Wildland Fire Fighting**

Response policy to dispatch sufficient fire fighting resources for a successful initial attack	Los Alamos, NM
Diver/operator training programs for wildland response equipment	California Division of Forestry

Wildland vehicle policy; vehicles and equipment used for wildland fires need to be safe and appropriate to the task	Hanford, WA; Los Alamos, NM
Communication must be established and full incident briefings must take place for all resources responding via mutual aid before assigned to operations	California Division of Forestry
Integration of command and control structures to ensure that wildland team and structural incident command group work together	Los Alamos, NM; California

## Volunteer fire Departments

### I. Health, Fitness, and Wellness

Implement U.S. Fire Administration Rehabilitation Guide for Emergency Responders	Ponderosa, TX; Bloomington, MN; King of Prussia, PA; Frederick Co. Maryland VFD
Air sampling is required prior to removal of self-contained breathing apparatus	Phoenix, AZ; King of Prussia, PA
Records of hazardous materials exposure kept for industrial firefighters	Los Alamos, NM
Physical fitness program is provided through membership in health club for exercise	New York Vol. Dept.
On-scene personnel are routinely sent to rehabilitation and vitals are taken and recorded; responders are hydrated etc.	Miami, FL
Comprehensive critical incident stress debriefing (CISD) and employee assistance program (EAP)	Pittsburgh, PA
Require personal protective equipment decontamination twice per year	Las Vegas, NV New York Fire Departments
Mental stress assistance programs, increase safety by helping employees who have problems	Miami, FL; Miami-Dade, FL; Phoenix, AZ

**II. Vehicle Safety**

Maintain accident information records; install cameras in cabs; develop policies concerning traffic signals; use an Accident Investigation Unit

New York City;  
Phoenix, AZ

Require an automatic alcohol and drug testing following any vehicle accident

King of Prussia, PA;  
Norfolk, VA;  
New York City

Vehicle safety policy that limits the number of occupants in the vehicle to the number of seatbelts in the vehicle

Phoenix, AZ; Miami, FL; New York City

**III. Prevention and Public Education**

Loss control policy, with the goal for commercial buildings that the business is back in operation in an average of two hours after the fire

Scottsdale, AZ

Multi-family dwellings sprinkler ordinances, includes all new four-family and existing four-family occupancies that were significantly renovated beginning in 1998

New York City

Fire Safe Cigarette Law

State of New York

Require sprinklers based on square footage and new construction sites that are beyond certain distances from fire stations

Peoria, AZ

Citizen service programs, such as “Connectors” and “Elder Links” Programs are designed for citizens to get the help they need from non-fire department services without using 911

Phoenix, AZ;  
Miami, FL; Miami-Dade, FL; Mesa, AZ

Nuisance alarm penalties that fine and bill alarm companies for transmitting non-emergency dispatches

Dothan AL; Tulsa, OK;  
Las Vegas, NV

State and local legislation prohibiting private use of fireworks	States of Arizona and New York; Miami, FL
Mark the outside of building with truss roofs for fire department	State of New Jersey; Hatfield, PA
Civil liability legislation for preventable fires	Dallas County, TX
<b>IV. Training</b>	
Provide live fire training to all firefighter recruits	Nassau County NY; New York City
Use certification as a funding incentive for firefighters	State of Pennsylvania
Consistent quality training delivered regionally	States of Maryland and Delaware
Public/private training centers with strong safety oversight and controls	Overland Park, KS
Require certifications for live burn instructor and live burn master instructor	Florida Fire College
Fire Department Training Officers Professional Associations, for sharing resources, networking, and professional development	States of Oregon, Florida, and Texas
<b>V. Structural Fire Fighting</b>	
Crew resource management (CRM) is under development and is modeled after the aviation industry; it will be a guide for utilizing resources in structural firefighter based on incident type	Atlanta, GA
Incident Safety Policy in place that requires a Certified Safety Officer (CSO) be dispatched on all working fires--the CSO has complete authority to stop any and all operations	Miami, FL; Atlanta, GA; Las Vegas, NV; King of Prussia, PA; Prince George's County, MD

Standard Operating Procedures through manuals and bulletins that define strategy and tactics for a variety of buildings such as private homes, office buildings, strip malls, apartments.	New York City
Respiratory Protection Standard, 29 CFR 1910.134, (OSHA 2-in 2-out rule) mandated and regulations followed	State of Florida; Mesa, AZ; New York City
Fire Department Safety Officers Association certification program is required	Atlanta, GA
Follow vacant building fire fighting procedures, including building markings	New York City
Adopt Safety Philosophy, such as: We will risk ourselves a lot within a structured plan, to save a savable life. We will risk ourselves a little, within a structured plan, to save savable property. We will not risk ourselves at all to save lives and property that are already lost	Phoenix, AZ; Mesa, AZ
<b>IV. Wildland Fire Fighting</b>	
Response policy is to dispatch sufficient fire fighting resources for a successful initial attack	Los Alamos, NM
Driver/operator training programs for wildland response equipment	California Division of Forestry
Wildland vehicle policy that requires that vehicles and equipment used for wildland fires need to be safe and appropriate to the task	Hanford, WA; Los Alamos, NM
Communications must be established and full incident briefings must take place for all resources responding via mutual aid before being assigned to operations	California Division of Forestry
Integration of command and control structures to ensure that wildland team and structural incident command group work together	Los Alamos, NM; State of California

## Appendix A

### Members of the United States Expert Panel

- William Jenaway, Executive Vice President, Volunteer Firemen's Insurance Services, Inc.
- John Norman, Chief, New York City Fire Department
- Dennis Rubin, Chief, Atlanta Fire Department
- David Washington, Chief, Las Vegas Fire Department
- Charles Dickinson, Deputy Administrator, U.S. Fire Administration and former Chief, Pittsburgh Fire Department
- William Bryson, Chief, Miami Fire Department
- Gerry Hoetmer, Executive Director, Public Entity Risk Institute
- Chris Neal, Director, International Fire Service Training Association and former Chief, Stillwater Fire Department, Oklahoma
- Dr. Robert England, Editor, *International Fire Service Journal of Leadership and Management* and Professor of Political Science
- Dr. John Granito, Project Manager
- Dennis Compton, Facilitator, former Chief, Mesa Fire-Rescue Department

### Members of the United Kingdom Expert Panel

- Keith Parr, West Midlands (Birmingham) Fire and Rescue Service, Risk Management
- Warren Pickstone, Greater Manchester Fire and Rescue Service, Group Manager, Health and Safety Support
- Andrew Strawson, Health and Safety Executive, Office of the Chief Inspector of United Kingdom Fire Services
- Paul Turner, London Fire and Rescue Service, Health and Safety Services
- Paul Young, Chief Fire Officer, Devon Fire and Rescue Service
- Chris Neal, Dr. Robert England, Dr. John Granito, and Dennis Compton attended from the United States

## References

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