



HAZARD ALERT

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Working to Prevent Line of Duty Deaths, Injuries and Illnesses to North Carolina Firefighters

Hazards Firefighters Face

The hazards firefighters face are incredibly dangerous, particularly while on scene. There is an element of unpredictability with the nature of the call (even with adequate size-up by incident command) and then the conditions either get worse or improve, but never stay the same.

While the general public is aware of typical firefighting hazards—heat, flame, smoke—there may be a lack of awareness of the hazards that firefighters face as a result of this dynamic work environment. Deteriorating fire conditions can lead to a severe and sudden decrease in visibility and a sharp increase in heat. The intensity can cause the firefighter to become disoriented and unable to concentrate and communicate effectively, resulting in the firefighter getting lost and potentially running out of air before rescue. There are also threats of structural collapse and falls through roofs and floors because the increased heat and flame weaken the structure.



Firefighter wearing full turnout gear.

Perhaps less obvious hazards firefighters face while on duty are those such as working roadside next to high speed traffic and distracted drivers (as well as struck-by hazards working around the fire apparatus itself), structural instability of older abandoned buildings, and hidden hazards as a result of structures that have been renovated and expanded. There are also modern-day hazards such as those created by green energy (for example, electrical hazards from working on hybrid/electric vehicles and ventilating a roof on a structure with solar panels). Structural firefighting hazards are also increased by modern-day lightweight construction and increased fuel loads.

Being a firefighter today means more than just fighting a fire and extricating people from motor vehicle accidents. It is also rescuing people from trenches, confined spaces, swift water, embankments, towers and collapsed structures. Firefighters respond to medical emergencies, law enforcement activity, and hazardous material spills and leaks. It is an honorable occupation, but a high stressed and highly hazardous one.

Line of Duty Death (LODD)

Although the U.S. Fire Administration fire fatality and injury data show that most cardiac arrest cases are caused by stress/overexertion, cardiac arrest can also occur from inhaling hot smoke and gas. This was the case with a line of duty death on July 28, 2011, in Asheville. The fire department responded to a four-alarm structure fire at a five-story commercial building with 60-plus firefighters on scene. The crew was initially assigned to search and clear the floors of occupants. Later the assignment moved to mounting an interior fire attack. Officials said the victim went into cardiac arrest after suffering from exposure to heat and smoke. A fellow firefighter put in a valiant rescue effort and sustained smoke inhalation injuries himself.

Early news articles alluded to the standpipe problems and locked doors being contributing factors in the cause of death. However, upon investigation by NCDOL, the evidence suggests that while these factors could have reduced the amount of time to extinguish the fire, they were not the direct cause of death.

This line of duty death, like the majority of fatalities incurred while operating at a structure fire, cannot be attributed to one or even two causal factors. The incident commander effectively managed the scene, especially considering the magnitude of this fire, and the resulting dual operation (when the mission changed to include the mayday rescue along with continued fire suppression). The personnel accountability reporting system seemed to be well managed, and a rapid intervention team (RIT) was established and responded accordingly.

Recommendations for Prevention

While OSHA standards are in place to protect the safety and health of America's workers and are enforced by NCDOL in North Carolina, protection of firefighters must go beyond the OSHA standards. The fatality described above was not due to any violations of the OSHA standards. However, this does not preclude fire departments from working to improve safety during on-scene operations and training evolutions.

There are many recommendations reflecting the multiple factors identified as possible contributing causes to the line of duty deaths and injuries. The following recommendations are not all-inclusive, but have been identified as contributing factors in recent incidents.

Air Management (managing the amount of air left in the self-contained breathing apparatus (SCBA) cylinder)

Firefighters and officers are in a continuous risk versus benefit evaluation. Firefighters by nature push themselves to produce maximum benefits while treading as close as possible to the threshold between moderate and high risk. The constant analysis of risk versus benefit is second nature to most firefighters, but becomes more of a deliberate decision when trying to determine how much longer to stay once the low air alarm activates.

Most firefighters will make a quick calculation on how long they can stay and fight, or how many more rooms they can search, based on factors like their distance to the exit, the conditions in which they are operating, and the benefit obtained by staying.

Some situations where the decision to leave might be pushed back are the conditions are improving, the firefighter is in the middle of a rescue, or is helping a downed firefighter (a mayday situation), or they are thinking knock down can be achieved in quick order. Some situations where the decision to leave might be accelerated are rapidly deteriorating conditions



SCBAs and firefighting tools.



SCBAs and firefighting tools.

and a fire attack that is having little effect (both of which are universal indicators of danger that require a change in tactics).

The difference between a firefighter's survival and a line of duty death is the accuracy of that calculation made when the low air alarm first activates. On that one day where conditions deteriorate rapidly, an extra minute or two of air can get the firefighter home at the end of the shift.

Fire operations need to ensure their firefighters and officers are trained on managing their air supply.

When to Call Mayday

Believe it or not, this is a hard call to make. There is a fear of calling mayday too soon and when not needed. Firefighters will wait until the last minute to make this call (or may not make it at all). Waiting to the last minute is too late. Even if a RIT has been established and is available for assignment, it will take some time for the rescuers to reach the mayday caller. Departments should develop operating procedures for when and how to initiate emergency radio traffic, and firefighters and officers need to train on mayday calling and responding. The culture of the fire department needs to change to encourage and support the firefighters in calling mayday earlier.

Other Recommendations and Requirements

- 🚒 Training on buddy breathing is essential in helping a fellow firefighter survive in a low air or no air situation. It is also vital to train with mutual aid departments if they use air packs from a different manufacturer.
- 🚒 Communication is always a big hurdle to manage on the fire ground. It can be especially difficult for the incident commander to hear all the radio traffic on a multiple alarm event.
 - 🕒 An extra set of "ears" standing by the incident commander is a good idea, along with an "interior set of ears." (With all the noise and activity on scene, the interior crews may miss transmissions.)
 - 🕒 Status updates must be communicated to the incident commander and to other interior crews (which may be best accomplished by face-to-face communications in addition to radio communications).
 - 🕒 The fire department should have guidelines for proper radio etiquette and standard operating procedures to address fire ground reporting requirements. For example, the personnel accountability reporting system ("calling PAR") is more than just checking the numbers (it is not just a roll call), it is also a status report—checking for and responding to problems as well.
 - 🕒 Ensure the RIT assignments and responsibilities are specific, and be prepared to expand the RIT response at larger scale events.
 - 🕒 The radios must be in good working order (no mechanical/technical issues), so that the communication equipment does not cause interference or a loss in transmission itself.
- 🚒 Ventilation management: Know when and where to ventilate based on exterior conditions, such as wind direction, and interior conditions (fire location and status). This ties back into communication as well. Improper ventilation can lead to a line of duty death.
- 🚒 Remember the basics: Refer back to the International Fire Service Training Association's Essentials of Firefighting, training received

in the academy or rookie school, and Firefighter I/II classes. For example, if using a fog nozzle and there is a problem getting water to the line through a standpipe system, try flushing the nozzle. Also, if possible, hooking into a standpipe on the floor below the fire floor and then flaking out extra hose to the floor above the fire floor.

- 🚒 Keep up with current technology and methods such as using a fold for high-rise packs that allows for quicker and easier deployment. A pack that's easier to deploy will be easier to flake out, reducing the possibility of kinking and knotting of the line.
- 🚒 Develop and implement departmental policies that incorporate the basics and reflect current methods, technologies, and leading recommendations such as a policy on elevator use in mid-rise and high-rise buildings.
- 🚒 Many of the LODDs from motor vehicle accidents are due to the driver or riders not wearing seat belts. National Fire Protection Association (NFPA) requires the driver and all people riding in a fire apparatus to be seated and secured with seat belts. Develop and implement an effective seat belt use policy.

Fire Administration

OSHA standards and other applicable consensus standards such as the NFPA require the employer to develop, maintain and implement a variety of safety and health programs.

The standard most frequently cited as serious in North Carolina for fire departments is the Respiratory Protection Standard, 29 CFR 1910.134. This standard requires a written respiratory protection program, fit testing, medical evaluations, training, respirator inspections and maintenance, etc. (The "two in/two out" rule of the Respiratory Protection Standard would be handled by fire operations.)

Other standards frequently cited as serious (note that there are many other standards applicable to the fire protection industry):

29 CFR 1910.120, HAZWOPER (Hazardous Waste Operations and Emergency Response Standard), particularly with procedures for handling the emergency response (the incident command system). Fire operations and fire administration will both have a hand in meeting these requirements.

29 CFR 1910, Subpart S, Electrical, especially 1910.304 and 1910.305, wiring design, methods and equipment for general use (use of flexible cords and cables, etc.) These hazards are typically found in the station.

29 CFR 1910.1030, Bloodborne Pathogens Standard, particularly a lack of an exposure control plan.

29 CFR 1910.1200, Hazard Communication Standard, particularly a lack of a written hazard communication program and improperly labeled or unlabeled hazardous chemicals. These hazards are typically found in the station.

Help for Employers

For more information concerning education, training and interpretations of occupational safety and health standards contact

Education, Training and Technical Assistance Bureau

Fourth Floor, Old Revenue Building, Raleigh, N.C.
Telephone: 919-707-7876, Fax: 919-807-2876

For more information concerning occupational safety and health consultative services contact

Consultative Services Bureau

Third Floor, Old Revenue Building, Raleigh, N.C.
Telephone: 919-707-7846, Fax: 919-807-2902

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