

IMPROVING FIRE FIGHTER SAFETY: NIOSH 2010-153

By Richard Schulte

NIOSH 2010-153, *Preventing Deaths and Injuries of Fire Fighters Using Risk Management Principles at Structure Fires*, dated July 2010 provides specific recommendations for improving safety on the fire ground. The following are excerpts from NIOSH 2010-153:

“WARNING! Fire fighters are often killed or injured when fighting fires in abandoned, vacant, and unoccupied structures. These structures pose additional and sometimes unique risks due to the potential for fire fighters to encounter unexpected and unsafe building conditions such as dilapidation, decay, damage from previous fires and vandals, and

other factors such as uncertain occupancy status. Risk management principles must be applied at all structure fires to ensure the appropriate strategy and tactics are used based on the fire ground conditions encountered.”

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“The National Fire Protection Association (NFPA) reported more than 500,000 structure fires each year between 1999 and 2007 with the direct dollar losses in 2007 alone totaling more than 10 billion dollars [Karter 2008]. The NFPA also reported approximately 30,000 fires each year from 2002 through 2005 in vacant buildings, defined as any building that was unoccupied and without a tenant, including but not limited to abandoned buildings [Ahrens 2009].”

“Based on statistics compiled by the NFPA, 269 fire fighters died on the fireground at structure fires during the years 1998 through 2008 [Fahy 2009]. Of these 269 fire fighters, 171 were killed inside the fire structure: 92 died from asphyxiation, 34 from burns, 25 from sudden cardiac death, 15 from crushing injuries, and 5 from internal trauma [Fahy 2009].”

“The mission of the fire service is to save lives and property from the threat of fire. In carrying out this mission, fire fighters are routinely exposed to certain known and predictable risks while conducting operations that are directed toward saving lives and property. Building occupancy status is just one variable that can impact incident management decisions at a structure fire.”

“Fire departments should work with Federal, State, and local authorities to develop and implement a strategy to identify, mark, secure, and where possible demolish unsafe structures within their jurisdictions. The IAAI/USFA Abandoned Building Project, conducted by the International Association of Arson Investigators and the US Fire Administration [IAAI / USFA 2006] is one example of a program that can be utilized to aid fire fighter safety and health by identifying, marking, and removing unsafe structures. The Abandoned Building Project Toolbox can be found at the Web site[:]

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<http://www.interfire.org/features/AbandonedBuildingProjectToolBox.asp>.”

“. . . The incident commander is responsible for recognizing and evaluating those risks and determining whether the level of risk is acceptable or unacceptable. However, risks taken to save property should always be lesser than those to save lives [Grorud 2009]. Risks to fire fighters versus gains in saving lives and property must always be considered when deciding whether to use an offensive or defensive attack. An offensive fire attack is one that normally includes interior operations that take the attack to the fire. It is aimed at extinguishing the fire and preventing fire extension. A defensive fire attack is one in which operations are conducted at a safe distance from a structure (outside the structure and collapse zone) and may focus on containing the fire rather than extinguishing it. Special hazards such as the risk of explosion may require an even larger safety zone. . . All offensive strategy incident action plans should be based on adequate support work (water supply, ventilation, lighting, utility control, accountability, RIT, etc.) to insure safe operating conditions on the interior.”

“Offensive operations should not commence or be performed unless they can be safely performed by the personnel available at the scene and within the fire department’s established safety procedures and SOPs. Incident command should be established by the deployed supervisory chief of-

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ficer outside of the hazard area for the overall coordination and direction of the interior operation. An incident safety officer should be present to assist the IC and to ensure that the health and safety system is established before the interior attack. Interior operations require the establishment of an uninterrupted water supply to provide an effective water flow for at least one attack line and one backup line. For interior operations, adequate ventilation (either horizontal or vertical) is required to minimize the risk of thermal insult to interior forces as well as to improve interior tenability, survivability, and visibility [Phoenix Fire Department 2009]. And for the safety of all personnel on the scene, interior operations should not commence or continue to be performed without personnel accountability in place or without the availability of an on-scene Rapid Intervention Team. The above tasks are key components of an offensive strategy in any building whether occupied or not [Klaene and Sanders 2000, Duffy 2009].”

“Retired New York City Deputy Fire Chief Vincent Dunn states the following: “When no other person’s life is in danger, the life of the firefighter has a higher priority than fire containment” [Dunn 1992]. Chief Dunn also states “The protection of life is the highest goal of the fire service...When a life is clearly threatened, there is no risk too great. At most fires, however, lives are not clearly endangered. At most fires, then, the priority of firefighting is the protection of the fire fighters’ lives. . .”

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“[The] International Building Code covers all buildings except detached one- and two-family dwellings and townhouses not more than 3 stories in height [ICC 2009a].”

Editor’s Note: The International Building Code includes provisions which address one- and two-family dwellings. Provisions contained in the International Building Code allow compliance with the International Residential Code as an alternative for one- and two-family dwellings and townhouses not more than 3 stories in height. Hence, the statement above is incorrect.

“On February 19, 2005, a 39-year-old male career fire captain died after being trapped by the partial collapse of the roof on a vacant, one-story, wood frame dwelling. The 50-year-old house was abandoned, in a dilapidated condition, and known by residents in the area to be a “crack house” at the time of the incident.”

“On May 3, 2002, two male, 38-year-old career fire fighters died while performing offensive operations at a two-story commercial structure fire. The structure was vacant, and all businesses in the building had previously been closed. Burglar bars and gates were installed and locked on all windows and doors of this structure. Many windows were boarded over . . .”

“On April 8, 2004, a 71-year-old male volunteer chief was fatally injured and two fire fighters were injured by a collapsing church facade. The church was locked and unoccupied.”

“Results of these NIOSH investigations suggest that fire departments, incident commanders, incident safety officers, and fire fighters may not fully consider information related to building occupancy, structural integrity, and fire involvement before entering structures to initiate interior operations and while performing offensive operations. . .”

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“. . .Risks to fire fighters’ lives must be balanced against gains when deciding whether to use an offensive or defensive attack. . .The challenge for the incident commander is to recognize when the level of risk becomes excessive and to call for a defensive strategy in situations where no lives are at risk.”

“Maintain crew discipline, avoid obvious safety hazards, avoid unnecessary risk taking and encourage your crew members to do the same.”

“When operating in an unoccupied building, NO RISK is worth your life or injury. Risk nothing for what is already lost; extend limited risk in a calculated way to protect savable property; and extend very calculated risk to protect savable lives [NFPA 2007; IAFC 2009].”

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“Abandoned and vacant buildings should be known in advance, based on preplanning and knowledge of local jurisdictions.”

“Include the age of the structure, structural integrity, the type of roof structure and supports (i.e., lightweight trusses, bowstring trusses, and heavy timber construction), the type of interior support structures (i.e., floor trusses, wooden I-joists, and support columns), the type of materials used in the structure (i.e., wood, steel, plastics, foam, or materials that produce toxic gases when subjected to heat), storage of flammable or toxic materials, the amount of load on roof structures that could weaken the supports (e.g., heavy heating and cooling units), water supply, and the presence of automatic sprinkler systems.”

“Consider the type of building when determining (1) the number of fire fighters, support officers, and the amount of apparatus and equipment needed to control the blaze, (2) the most effective point of attack for extinguishing the fire, (3) the most effective method of venting heat and smoke, and (4) the nature of the attack (offensive or defensive) [NIOSH 2005b].”

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“Ensure the availability of adequate resources, such as a rapid intervention team (RIT), backup hose lines, and emergency medical services (EMS) personnel.”

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“Consider all manual fire-suppression activities within the collapse zone to be an offensive attack. No personnel should operate in offensive positions during a defensive attack.”

Analysis

On October 28, 2010, NIST released a draft report on its investigation of the fire at the Sofa Super Store in Charleston, South Carolina (which occurred on June 18, 2007). Based upon the information contained in NIST’s report, the Charleston Fire Department was conducting interior manual fire fighting operations in a building where no life was in peril. (All of the occupants of the Sofa Super Store had evacuated the building, with the exception of one employee in a repair shop who was trapped in the building when an overhead fire door closed. The trapped employee was rescued from outside the building by cutting through a metal exterior wall.)

If the Charleston Fire Department had implemented and observed the precautions contained in NIOSH 2010-153, it is likely that the fire at the Sofa Super Store would have been no more than a routine fire.

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NIOSH 2010-153 is, in essence, just a compilation of common sense concepts. Unfortunately, common sense isn’t so common. Interior fire fighting operations are often times a lot like going to a casino, but there are ways to improve the odds of not losing it all. Observing the precautions contained in NIOSH 2010-153 is one way to improve the odds. Providing sprinkler protection for buildings is another way to improve the odds.

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