Why is Compartment Fire Behavior Training (CFBT) Important?

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Firefighter safety during firefighting operations has seen minimal improvement over the last 27 years despite significant technological advances in personal protective equipment. The average number of fatalities occurring on an annual basis has decreased, but so has the number of structure fires. Equally disturbing has been the increasing rate of fatalities at structure fires as a result of traumatic injury. In a National Fire Protection Association (NFPA) study of firefighter fatalities in structure fires, Fahy (2002) observes that "the death rates for the three major causes of fatal injuries to firefighters while operating inside structure fires [lost inside, structural collapse, and fire progress] have been rising" (p. 10). This same study points to a lack of experience as a potential cause of fireground fatalities due to traumatic injury resulting from rapid fire progress or collapse.

Gresham Fire and Emergency Services Photo by Jack Hana

While firefighter fatalities during emergency incidents are unacceptable, those occurring during training are even less so. From 1987 to 2001 the rate of injuries resulting from fire service training activity increased by 15%. During that same time period the number of training related fatalities has also been increasing. Live fire training has typically been one of the leading types of training activity resulting in fatalities (United States Fire Administration, 2003). Do these trends in fireground and training injuries and fatalities have a common cause? Analysis of incidents involving rapid fire progress during both structural firefighting and live fire training

points to a lack of understanding about fire behavior and the impact of tactical operations (Grimwood, Hartin, McDonough, & Raffel, in press).

What Can We Do?

If you keep doing the same thing, you will continue to get the same results. Reducing the risk of injuries and fatalities due to rapid fire progress (both on the fireground and during live fire training) necessitates substantial change. This leads to the following four propositions:

1. If in fact, the lack of improvement in firefighter safety on the fireground is in part a result of limited firefighting experience; increased, effective live fire training will have a positive impact on firefighter safety.
2. If the frequency of live fire training is simply increased without changes in policy and practice, training injuries and fatalities will to also increase (following the current trend).
3. Effective changes to policy and practice would reduce injuries and fatalities during both fire training operations (directly) and structural firefighting (indirectly).
4. The most significant factor influencing the safety of participants and effectiveness of live fire training is the knowledge and experience of the instructors involved in this critical training activity.

Realistic Training is Essential!

Structure fires present complex and dynamic challenges. Firefighters must protect the lives of building occupants as well as their own while controlling the fire and protecting the uninvolved areas of the structure and its contents. These conditions require that firefighters have a high level of situational awareness and make effective decisions with the limited information available. (Klein, 1999; Klein, Orasanu, Calderwood, & Zsambok, 1995).

Firefighters learn their craft through a mix of classroom and hands-on training. A majority of skills training is performed out of context (i.e. no smoke or fire) or in a simulated fire environment (i.e. using non-toxic smoke). However, this alone does not prepare firefighters to operate in the heat and smoke encountered in an actual structure fire or develop critical decision-making skills. Developing this type of expertise requires training under actual fire conditions.

Live Fire Training

It is unknown exactly when fire service agencies began the practice of live fire training to develop and maintain skill in interior firefighting operations. While specific data is unavailable, it is likely that firefighter fatalities have occurred during this type of training activity since its inception.

> *Two Firefighters Die in Fire Training Flashover* – On January 26, two firefighters died from burns and smoke inhalation during a search and rescue drill held in a vacant single story building (Demers Associates, 1982, August).
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> *Two Firefighters Die in Fire Training Flashover* **–** On July30, two firefighters died from burns and smoke inhalation during a search and rescue drill held in a vacant single story building (National Institute for Occupational Safety and Health, 2003)

At first glance, the only difference between these two incidents is the month and day of occurrence. However, these two tragic events occurred 20 years apart. The first occurred in Boulder, Colorado and was one of the driving forces in the development of National Fire Protection Association 1403 *Standard of Live Fire Training* (National Fire Protection Association, 2002).This standard has evolved in reaction to continuing fatalities during live fire training. Live fire training policy is defined by three interrelated elements: (a) occupational safety and health regulations, (b) national consensus standards such as NFPA 1403, and (c) local standard operating guidelines and procedures.

In addition, the courts have also weighed in on the responsibility of instructors to ensure the safety of students during this type of training activity. A fire department training officer in Lairdsville, NY was found guilty of criminally negligent homicide due to a fatality during live fire training in an acquired structure (Little, 2002). While this criminal proceeding did not directly establish detailed live fire training policy, this landmark case established precedent for holding instructors criminally accountable for fatalities occurring during live fire training. In addition, this incident generated sufficient political interest that the New York state legislature passed regulations governing live fire training procedure and NFPA 1403 was modified in 2002 to proscribe the use of humans as simulated victims during live fire training.

NFPA 1403 (National Fire Protection Association, 2002) places specific emphasis on addressing unsafe acts and conditions directly connected to accidents that have occurred during live fire training. Undoubtedly compliance with NFPA 1403 reduces the risk to firefighters participating in live fire training. However, even strict compliance with this standard limits, but does not preclude the possibility of participants being injured or killed due to the deteriorating conditions encountered with rapid fire progress.

Safe and effective live fire training is dependent on knowledgeable and experienced instructors. Instructors must have expertise in fire behavior and tactical operations. In addition, instructors must understand how to facilitate learners development of this same type of expertise. NFPA 1403 (National Fire Protection Association, 2002) does not explicitly address competency requirements for instructors involved in delivering this type of training. Qualification of instructors is addressed in general terms by specifying that instructors must “qualified by the authority having jurisdiction to deliver fire fighter training, who has the training and experience to supervise students during live fire training evolutions” (p. 4).

CFBT and Instructor Qualifications

CFBT integrates the topics of fire behavior, fire streams and ventilation within a structural firefighting context. This training concept provides an integrated framework for developing structural firefighting knowledge and skills. The difference between live fire training in general and CFBT is the emphasis on developing understanding of fire behavior and the influence of tactical operations. In many cases, live fire training focuses to a greater extent on the tactics involved and less on fire behavior. While tactical proficiency is important, understanding fire behavior and recognition of fire development and key fire behavior indicators is critical to firefighter safety and survival.

While not explicitly addressed in NFPA 1403, The British *Fire Service Manual Volume 4: Guidance and Compliance Framework for Compartment Fire Behaviour Training* (HM Fire Service Inspectorate, 2000) provides guidelines for instructor qualification. Adapting this framework to an American context points to the need for instructor competence in several areas:

- Regulations, standards, and training guidelines
- Fire behavior in compartment and fire control tactics
- CFBT facilities and operations
- Effective instructional methods in the delivery of CFBT
- Health and safety during live fire training
- Safe and effective use of acquired structures for live fire training

Instructor competence is dependent on both fireground experience and an effective training program to help individual instructors increase their depth of knowledge and understanding as well as developing effective methods for assisting student learning.

Why is CFBT Important?

Revisiting the original question of why CFBT is important, the answer is the critical need to reduce firefighter fatalities due to traumatic cause while working at structure fires. CFBT does not completely address the causes of traumatic injury and fatalities. However, fire behavior expertise and proficiency in structural firefighting tactics has solid potential for reduction of the risks presented by structural firefighting operations. Simply increasing the use of live fire training is not enough; existing practices have resulted in an increasing rate of firefighter injuries and fatalities during training without any demonstrated effect on fireground safety. The integrated approach provided by CFBT delivered by qualified instructors has substantial potential to reverse this trend.

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