COMMERCIAL BUILDING FIRE BEST PRACTICES PART 1

By Fire Captain Ethan Johnson

Fires in commercial buildings represent unique risks to responding firefighters. Increased fuel loads and large open spaces require specific tactics in order to safely mitigate a fire related emergency. Strategic handline placement, high rates of water application and methodical advancement are critical.

According to the U.S. Fire Administration's (USFA) report, Fire in the United States 2008–2017, nonresidential building fires constituted only 7% of the total fire problem in 2017, the most recent year for which data are available. A 2020 NFPA report that examined firefighter deaths per 100,000 structural fires indicated, *"There were 3.0 fireground deaths per 100,000 nonresidential structure fires from 2014 through 2018, compared to 2.7 deaths per 100,000 residential structure fires."*

Departments must develop specific strategies and tactics to handle commercial building fires. When confronted with a high risk-low frequency event like a fire in a non-residential or commercial building, firefighters often default to residential dwelling fire strategy and tactics. This is a dangerous practice which can jeopardize the lives of firefighters. Recent UL Firefighter Safety Research Institute (UL FSRI) studies showed that fires in commercial buildings react differently because of fuel loads and building characteristics than fires in residential buildings.

Commercial buildings frequently have large-square-footage floor plans, lack compartmentation and have high ceilings. Another major difference between residential and commercial structures is that moderate or large commercial structures can conceal a large fire without showing the classic indications of a working fire. For example, a fire in a 1,000-square-foot house will probably fill the house with a smoke layer that's close to the floor. The same size fire in a 5,000-square-foot commercial structure may present with smoke only at the ceiling level. Although the volume of smoke is the same, it's dispersed over a larger area. We tend not to feel threatened by smoke that's 12 feet above us, but the roof assembly is directly exposed. This increases the potential for collapse.

These specific building features can mask the severity of a fire because of the larger interior volume that smoke and products of combustion must fill before they vent through natural openings. These large-volume spaces also contribute to rapid fire growth because of the oxygen levels that are available in the space. (Exploratory Analysis of the Impact of Ventilation

With the above in mind, current residential based search tactics in commercial buildings need to be addressed. In many cases, fire crews enter these large spaces without the protection of a hose line or the ability to orient themselves in moderate to heavy smoke conditions. Coupled with the limited points of egress of a commercial building as opposed to a smaller residential structure, the dangers of becoming lost in an IDLH environment increase dramatically. In his "Firefighter Disorientation Study", Fire Captain William Mora of the San Antonio Fire Department (2003), described a "Disorientation Sequence" which contributed to line of duty deaths of firefighters. He found that the following factors existed in each fatal incident he studied:

- *Incidents occurred in an enclosed structure*
- *Incidents occurred during aggressive interior attack*
- *Incidents occurred during prolonged zero-visibility conditions (for more than 15 minutes)*
- *Incidents involved a separation from the handline or crew*
- *Incidents occurred when crew integrity was lost*

It is common practice for first arriving apparatus to report to side Alpha to begin operations as with residential fires. However, this may not be the best point of entry choice with commercial building fires. The USFA's 2020 report looked at the causes of fires in nonresidential buildings. *"For nonresidential building fires, three causes accounted for at least half of the fires: Cooking was the leading cause of fires (30 percent), followed by other unintentional or careless actions (11 percent) and intentional actions (10 percent)."* Often, kitchens, electrical panels, HVAC systems and other mechanical equipment are housed near the rear of the building.

It's clear that fires at commercial or non-residential structures present a unique set of challenges. How can we manage the risks involved in fighting these fires? Are there specific tactics we can employ to minimize the risk to firefighters while still providing the public with the maximum level of protection? In part 2, we will review some best practices that can be used to overcome these challenges.