

INTRODUCTION

FLASHOVER is a leading cause of firefighter injuries and deaths (approximately 10% of firefighter deaths are a result of rapid fire development: flashovers, backdrafts and wind-driven flame fronts). The potential for flashover to occur is present at almost every working fire incident. However, with knowledge, training and experience flashover warning signs can be recognized and the risk of becoming trapped by flashover reduced.

Improved safety equipment has resulted in reduced firefighter injuries and improved overall fire suppression activities. However, it has also allowed firefighters to expose themselves to increasingly higher temperatures. Body parts once used as indicators of heat buildup are now covered.

DEFINITIONS

ROLLOVER: Sporadic flashes of flame mixed with smoke at the upper ceiling level just before flashover occurs. This is often initiated by fire burning up into a hot smoke layer with the flame hitting the ceiling and spreading laterally. It is a warning for firefighters to withdraw from the area if charged lines are not in place and flowing.

FLASHOVER: Flashover may be defined as the ignition of combustible surfaces and/or gases in an area heated by convection and/or radiation, resulting in a sudden and intense rise in temperature. It usually occurs at a stage in the fire in which all exposed combustible surfaces reach ignition temperature and ignite virtually simultaneously. Flashover can be sudden and unpredictable! Flashover signals the death of any trapped victim or firefighter inside that particular burning room or area, and the end of any effective search or rescue operation, unless the fire is extinguished.

THERMAL BALANCE: The stratification of heated smoke and gases in the upper levels of a room. Highest temperatures will be at the ceiling, and lowest temperatures and best visibility will be at ground level.

CAUSES

- Heat build-up in a room. Before flashover, the fire is low in intensity and spreads slowly. Heat is radiated in all directions, gradually heating up all combustibles and flammable gases to their ignition temperature.
- The increasing use of synthetics in furnishings and lightweight building materials results in greater amounts of heat and flammable gases being liberated.
- Lightweight roof construction makes vertical ventilation operations more dangerous.
- Presence of accelerants.
- Hazardous materials present in garages, commercial and industrial dictate more cautious entry allowing the fire to develop more headway.

WARNING SIGNS OF FLASHOVER

- Firefighters are forced to stay low because of high heat.
- Smoke is dense and turbulent, often with a distinct thermal layer.
- Sporadic flashes of flame are visible through the smoke at the top of window, door opening or ceiling level. Rollover generally precedes flashover.
- Free burning fire - high heat production

GENERAL FIREGROUND SAFETY

AWARENESS

- Continually re-assess heat buildup and changing conditions. Be aware of your environment and surroundings; recognize changing conditions.
- Remember that full PPE will disguise real conditions from you.
- Observe upper atmosphere for signs of rollover.
- Monitor radio traffic for status reports from other companies.
- Fire located in concealed spaces, buildings with high ceilings, or fire in remote locations will be difficult to assess for warning signs.

SUFFICIENT GPM KILLS FLASHOVER

- Evaluate effectiveness of hose streams on the fire.
- Coordinate fire attack with the ventilation team, vertically ventilate whenever safely possible, if appropriate.
- Always leave a member at the nozzle in case of re-ignition.
- In rooms that have little or no ventilation, keep the nozzle set on straight stream.

EXITS

- Crawl, stay low.
- Doors are safer entrances/exits than windows.
- Have multiple exits available (ladders needed for multi-story buildings).
- Mark exits by placing a bright light at ground level just inside doorway.
- Note the configuration of the building you are entering to assist in finding a way out.
- Never let fire spread between you and your exit.
- In above ground firefighting, maintain a safe exit by controlling the stairway before going above the fire floor.

FLASHOVER SURVIVAL TACTICS

SURVIVAL TACTIC NO. 1

REALIZE THERE IS NO SUCH THING AS A ROUTINE STRUCTURE FIRE

In 25 case histories in which a fatal or near fatal flashover occurred, the words “routine fire” and “no big deal” were frequently used at the beginning of each one. Firefighters cannot become complacent, even though a fire appears small and routine.

SURVIVAL TACTIC NO. 2

REALIZE THAT YOUR TURNOUTS WILL NOT PROTECT YOU FROM A FLASHOVER

The thermal insulation provided by your turnout allows you to go deep inside a structure fire without feeling an important early warning sign of flashover - INTENSE HEAT.

Flashover temperatures rapidly reach up to 1000 degrees Fahrenheit. Your skin will begin to burn at 124 degrees. At 500 degrees your face piece will begin to cloud, then soften and melt. If you are caught in a flashover, without a way to extinguish it, direct flame contact will cause burns to begin within two (2) seconds; fatal burns will occur within approximately seventeen (17) seconds.

SURVIVAL TACTIC NO. 3

REALIZE THAT FLASHOVER IS NOT A CONDITION THAT YOU CAN HANDLE WITHOUT A HOSELINE, NO MATTER HOW WELL TRAINED YOU ARE. ONCE FLASHOVER STARTS, IF EXTINGUISHMENT IS NOT POSSIBLE, ESCAPE QUICKLY OR DIE.

In a flashover event there is a loss of rational thought, probably caused by the intensity of pain inflicted by the heat. It will turn you into an instinct-driven animal. The instinct to escape is usually the most predominant thought. Words like "dive," "fell" and "rapid egress" were associated with firefighters that survived.

SURVIVAL TACTIC NO. 4

VENTILATION IS MORE IMPORTANT THAN EVER

Changes in building construction and the use of synthetic materials over the past several years have made conditions in structure fires more favorable for flashover. Insulated windows, doors, walls and ceilings keep in heat and smoke. Often it's difficult to tell where the fire is located in the structure. Ventilate rapidly and effectively to release the heat and flammable gases, and constantly monitor conditions while inside. Effective horizontal and vertical ventilation is critical to reducing the effects of flashover, and assisting with interior fire attack and search and rescue conditions.

SURVIVAL TACTIC NO. 5

OPEN DOORS, REMOVE WINDOW BARS, AND LADDER WINDOWS AND FIRE ESCAPES AS SOON AS POSSIBLE

A rapid escape is critical to the survival of firefighters caught in a flashover situation. Many firefighters who have escaped flashover have done so by jumping out of windows.

Having ladders available may prevent firefighters from having to dive or jump from upper story windows or balconies.

SURVIVAL TACTIC NO. 6

FORCIBLE ENTRY SOMETIMES MEANS FORCIBLE EXIT

Exterior crewmembers assigned the task of forcible entry should open all ground floor openings to the fire building. Interior crews should remember that if they are forced to use an alternate exit, a forcible entry tool may be required from the inside.

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