



East Fork Fire and Paramedic Districts
Training and Safety Division

STRUCTURE

- TOPIC:** FLASHOVER RECOGNITION
- TIME FRAME:** 1:00
- METHOD:** Handout, Discussion
- OBJECTIVES:**
- Define Flashover
 - List Factors Involved in a flashover
 - List observation of a flashover
 - Describe ways to prevent flashover
- MATERIALS NEEDED:**
- Handout (Attached)

REFERENCES:

FLASHOVER: TIME TO GET OUT

By [Jason Poremba](#)

- ASSIGNMENT:**
- Discuss as a crew

- SUNPRO CODE:**
- STR 01.05

Flashover: Time to Get Out

By [Jason Poremba](#)

Firefighters are all taught about the dangers of flashovers in fires and the limited time they have to get themselves to safety. Flashovers are a rapid event that involve a significant increase in fire growth and development. Typically this is a change from a fire located at a specific source or "fuel package" to a fire that takes over every other combustible object of the compartment involved without actual flame contact. The heat transfer at and beyond flashover is primarily by radiation.

To understand how to get out of a flashover, we must first understand what a flashover is. NFPA 921 defines flashover as, "A transitional phase in the development of a compartment fire in which surfaces exposed to thermal radiation reach its ignition temperature more or less simultaneously and fire spreads rapidly throughout the space resulting in full room involvement or total involvement of the compartment or enclosed area."

So what are the factors involved in a flashover? Here are some, compiled from various sources:

- Location of fire
- Size of compartment
- Shape, area and volume of compartment
- Heat gain and heat loss
- Contents and their relative surfaces, materials, etc.
- Ambient temperature at beginning of fire
- Location and height of doors, windows and openings
- Fire growth rate

In reading "[Flashover and Fire Analysis](#)" by Patrick and Kathryn Kennedy, we also learn that just because a fire leads to full room involvement, it does not always mean the room flashed over. Reports point out that ventilation is one of the most significant factors in whether flashover ever occurs, with Vincent Dunn describing it as one of his three recommended ways to delay such an event.

The Kennedys also state, "The indicators of flashover do not define flashover. Rather flashover is defined by its nature (rapid transition to a full room involvement." Another misconception among fire investigators is the rate of speed for a flashover. Kennedy points out that investigators make subjective decisions based on rate of "full room involvement," and often deem a fire to have been started with some form of accelerant. In fact, NFPA 921 states the contrary, saying, "Research has shown that time to flashover from open flame can be as short as 1 1/2 minutes in a residential fire."

Here are some reported first-hand observations on indications flashover occurred from "Flashover and Fire Analysis."

- Witnesses commonly report fire "exploded"
- Rapid flame extension that moves laterally through compartment
- Breaking of external windows
- Flames extend beyond compartment to adjacent compartments
- Full room involvement

Ways to prevent

By proper ventilation, we can eliminate superheated air and gases from the compartment. Depending on the fire, you can call for a horizontal or vertical vent. Just be conscious of the venting and location of the vent to not get other portions of the uninvolved structure involved.

This method also reduces heat in the compartment as well as increasing visibility for potential search operations. Vincent Dunn mentions in [his report](#) that non-ventilation is also another option. "By not venting and instead closing the door to the burning room, you can also delay flashover," he says.

"By not venting, you starve the fire of oxygen, which slows down the combustion rate, which slows down the build-up of heat in the room. This may be done when there is a delay in stretching a hose line and all persons are out of the burning room."

If ventilation is not immediately possible, or a hose line is not in place, you can also consider a portable extinguisher to cool down the heat in the burning compartment to delay the potential flashover.

The odds of escaping a flashover alive are slim, and escaping a flashover without injury is even rarer. Knowing the warning signs are key in giving you the signal to get out immediately. Multiple sources average your time for a flashover to be from 7-10 seconds. So the best case scenario is you have 10 seconds to react and get to safety. This is usually about 5' of distance for the average firefighter.

The most common signs of a flashover are high heat and rollover. The heat will be extreme so be on the alert for a severe and sudden change in temperature. This heat will be so intense it will be felt through your gear. Rollover is often confused with flashover. Rollover is usually observed by flames "rolling" or "dancing" across the ceiling. Rollover is the ignition of gases present in the room, not contents.

As stressed in previous articles, full PPE is key, but not always a live saver. Temperatures during a flashover often exceed the PPE limitations. Also try to always consider alternate egress points or areas of potential refuge which could include doors, windows or adjacent rooms.

Be proactive, read the smoke, study the fire and if you see something report it. Do not perform PPV until a charged hose line is in place. The key for me is that we need to put more emphasis on staying out of trouble in the first place, and less on the last few seconds we have to save our life.