



## FIRE INSTRUCTOR I

### Student Presentation Lesson Plan

## 6-Flashover Basics

### Outline of Instruction

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#### Objective

Upon successful completion of this lesson, the student shall be able to:

- Recognize signs, causes, and effects of rapid fire development. [NFPA® 1001, 5.3.11]

#### Instructor Directions

1. Set up non-projectable training aids
  - a. Chart pad to include:
    - i. Title Page
    - ii. Acronym
    - iii. Summary
    - iv. 1 Application scenario
    - v. 2 Evaluation questions
2. Set up projectable training aids (LCD projector & computer)
3. Present lecture utilizing this outline of instruction, non-projectable and projectable audio visual aids.
  - a. Overall time 18 min. (set up, present topic, and take down of audio visuals)
  - b. Presentation time 8-12 min. (presentation time is part of the 18 min)
4. Breakdown of projectable training aids.

**Reference** Stowell, F.(2013). Essentials of Fire Fighting and Fire Department Operations (6<sup>th</sup> ed.). Upper Saddle River, N.J.: Brady Pub.; ISBN# 978-013-314080-4

## Preparation

### Introduction

- Instructor introduction
- Objectives
- Preparation Step

## Presentation

### Rapid Fire Development

1. Responsible for numerous firefighter deaths, injuries
2. Protect yourself, crew
  - a. Recognize indicators
  - b. Know conditions created by situations
  - c. Determine best action to take before occurrence

**Rapid fire development is responsible for numerous deaths and injuries.**

Protect yourself and your crew

- Recognize indicators
- Know conditions created by
- Determine best action to take before

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**Flashover occurs when combustible materials in a compartment ignite almost simultaneously.**

Typically occurs during growth stage – May occur during fully developed stage	Environment of room changes from two-layer condition to single well mixed, untenable hot gas condition
Transition between pre-flashover to post-flashover can occur rapidly	Conditions during <ul style="list-style-type: none"><li>• Volume of fire can increase to fill entire room</li><li>• Burning gases push out of openings</li></ul>

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### Flashover

Combustible materials in compartment, gases produced by pyrolysis ignite almost simultaneously – Full-room involvement

Typically occurs during growth stage – May occur during fully developed stage

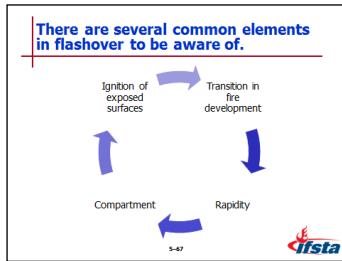
Environment of room changes from two-layer condition to single well mixed, untenable hot gas condition

Transition between pre-flashover to post-flashover can occur rapidly

Conditions during

Volume of fire can increase from  $\frac{1}{4}$  to  $\frac{1}{2}$  room's upper volume to fill entire room – Potentially expanding out of any openings

Burning gases push out of openings at substantial velocity



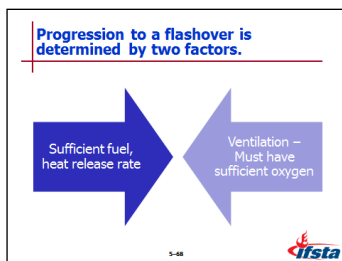
## Common elements

Transition in fire development – Represents transition from growth stage to fully developed stage

Rapidity – Not an instantaneous event, but happens rapidly (often in seconds) to spread complete fire involvement within compartment

Compartment – Must be enclosed space such as single room or enclosure

Ignition of all exposed surfaces – Virtually all combustible surfaces in enclosed space become ignited

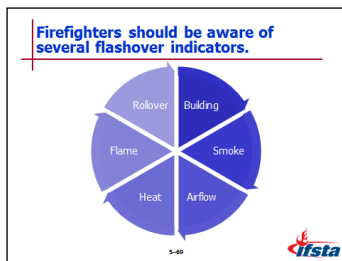


Factors that determine if fire will progress to flashover

Sufficient fuel, heat release rate

Ventilation – Must have sufficient oxygen

Survival rates extremely low – Typically occurs at 1,100°F (600°C) ceiling temperature



Be aware of indicators

Building indicators

Can occur in any building

Interior configuration, fuel load, thermal properties, ventilation will determine how rapidly

Smoke indicators – Rapidly increasing volume, turbulence, darkening color, optical density, lowering of hot gas level

Airflow indicators

High velocity, turbulence

Bi-directional movement with smoke exiting at top of doorway, fresh air moving in at bottom

Pulsing air movement

Heat indicators

Rapidly increasing temperature in compartment

Pyrolysis of contents or fuel packages located away from fire

Darkened windows

Hot surfaces

Flame indicators – Isolated flames in hot gas layers or near ceiling

Rollover also indicator

Condition where unburned fire gases at top of compartment ignite, flames propagate through hot gas layer or across ceiling

May occur during growth stage

Flames may be observed in layer while gases reach combustible temperature

Will generally precede, but will not always result in flashover

[Type here]

## Chart Pad:

### Title Page

- Name, Department, Title of Presentation

### Acronym

- **L.I.P.** (Life Safety, Incident Stabilization, Property Conservation)  
instructor relates these priorities to the lecture

### Summary (2-4 key points)

- Instructor reviews 2-4 key points of the lesson plan to clarify uncertainties, prevent misconceptions, increase learning and improve retention

### Application (1 scenario)

- The student is given a scenario where the student will apply all of the knowledge that was given in the lecture. *This is not a question*, it is merely the explanation of the scenario.

### Evaluation (2 questions)

- Instructor should ask students 2 direct questions that were presented during the lesson. *Answer to the questions must be give after asking the question.*