



International
Association
of Fire Chiefs



National
Fire Protection
Association

Fire Officer

Principles and Practice
THIRD EDITION



Chapter 18 Fire Cause Determination (Fire Officer I)

Fire Officer I Objectives

- Identify the common causes of fire.
- Explain when to request a fire investigator.
- Describe how to find the point of origin of a fire.
- Discuss the legal considerations of fire cause determination.

Introduction

- An investigation is conducted to determine how a fire started.
- Understanding the cause:
 - Helps prevent future fires
 - Helps determine if criminal acts were involved

Introduction

- The incident commander is responsible for conducting the investigation.
- The legal responsibility for conducting the investigation is defined by state or local legislation or regulations.

Common Causes of Fires

- A relatively small number of causes are responsible for a large number of fires.

Cooking	42%
Heating	17%
Intentional	8%
Electrical malfunction	6%
Smoking	5%
Clothes dryer or washer	4%
Exposure to other fire	3%
Candle	3%
Playing with heat source	2%

Reprinted with permission from NFPA: Fire Analysis and Research Division. "An Overview of the U.S. Fire Problem". National Fire Protection Association, September 2012.

Requesting an Investigator

- The fire officer should determine the point of origin and probable cause.
 - On small or routine incidents, this is the only investigation conducted.

Requesting an Investigator

- A set of guidelines explains when to request an investigator:
 - Death or serious burn injury
 - Deliberate fire
 - Large-loss fire
 - Possible crime



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Fire Growth and Development

- To determine the fire's point of origin, the fire officer must understand fire behavior, growth, and development.
- Three methods of heat transfer:
 - Conduction
 - Convection
 - Radiation

Disabled Built-in Fire Protection

- May be encountered in fires involving industrial or commercial occupancies
- Look for damage or vandalism:
 - Sprinkler hook-ups
 - Hose cabinets
 - Hard-wired smoke detectors
 - High-rise communication systems

Delayed Notification or Difficulty Getting to the Fire

- Be alert for conditions that delay the fire department's ability to get to the fire:
 - Malfunctioning keys or key cards
 - Vandalized doors
 - Materials blocking access
 - Points of origin in the attic, the basement, or a closet

Tampered or Altered Equipment

- Document unusual conditions:
 - Indications of forcible entry
 - Altered electrical devices
 - Use of excessive fuel

Legal Considerations

- The fire officer who investigated the fire may be called to testify in court.
 - May be challenged on issues of proper procedure

Searches

- Typically no search warrant is needed to enter the fire scene, collect evidence, and determine the cause of a fire.
- A warrant is required after fire origin and cause have been determined:
 - Administrative search warrant
 - Criminal search warrant

Securing the Scene

- If the fire officer suspects a crime has occurred:
 - Immediately request a fire investigator.
 - Secure the scene and maintain custody until the investigator arrives.

Evidence

- **Evidence:** material objects and statements that are admissible as testimony in a court of law
 - Demonstrative evidence
 - Documentary evidence
 - Testimonial evidence

Evidence

- Artifacts could include:
 - Remains of the material first ignited
 - Remains of the ignition source
 - An item on which fire patterns are present

Evidence Must Be Protected

- The investigator's goal is to identify the point of origin and the cause of the fire.
 - Fire scene reconstruction: re-creating the physical scene before the fire occurred, either physically or theoretically

Evidence Must Be Protected

- The investigator must locate, examine, and preserve evidence.
 - The fire officer must determine when to stop firefighting operations as part of this effort.



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Summary

- To prevent future fires, it is important to understand the causes of past fires.
- The fire officer should be able to determine a point of origin and a cause.
- To determine the point of origin, the fire officer must understand fire growth and the three methods of heat transfer.

Summary

- The fire investigator must take into account a citizen's rights.
- A fire officer who suspects a crime should request a fire investigator.
- There are three types of evidence: demonstrative, documentary, and testimonial.

Summary

- Fire scene reconstruction involves re-creating the scene before the fire occurred.