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Analyzing the
Incident for
Cause and
Responsibility

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Knowledge Objectives

- Define the four classifications of fire cause.
- Explain the differences between cause and responsibility.
- List factors that can contribute to fire spread.

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Skills Objectives

- Analyze a fire incident for cause and responsibility.
- Analyze an explosion incident for cause and responsibility.

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Introduction

- Responsibility for the fire or explosion is defined as:
 - The accountability of a person or other entity for the event or sequence of events that caused
 - The fire or explosion
 - Property damage
 - Bodily injuries or loss of life

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Cause of the Fire or Explosion

- It is not the ignition source.
- Rather, it is the circumstances/actions that brought the competent ignition source in contact with the fuel and oxidizer.
 - e.g., negligence, product defect, intentional act

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Classification of the Cause

- Accidental
- Natural
- Incendiary
- Undetermined

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Accidental Fire Cause

- When fire is not the result of a deliberate act
- Includes friendly fires ignited deliberately but that become hostile
 - e.g., brush or trash fires that spread
- Category has traditionally been used for fires ignited by juveniles below the legal age of responsibility

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Natural Fire Cause

- When fire ignites without human intervention
- Includes fires from:
 - Lightning
 - Wind
 - Earthquakes



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Incendiary Fire Cause

- When fire results from deliberate acts
 - The person starting the fire knows he or she should not.
- Fires resulting from reckless or negligent acts may be included.
- Mindset or mental state (intent) of fire setter is key element of this classification

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Undetermined Fire Cause

- Appropriate category for:
 - Fire not yet investigated
 - Fire under investigation
 - Investigated fire whose cause is not proven to an acceptable level of certainty
- No negative stigma should be attached to this classification.

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Discussion of Classification (1 of 2)

- After hypothesis is supported by data, fire is classified as:
 - Accidental, natural, or incendiary
- If not supported by data, investigator returns to earlier step of scientific method
- Sometimes cause can be determined without physical evidence of ignition source

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Discussion of Classification (2 of 2)

- “Suspicious” is not acceptable classification
 - Lay person or news media might use this term, but the investigator should not.
 - Suspicion refers to a level of proof or level of certainty.
 - Fires where the level of certainty is only a suspicion should be classified as “undetermined.”

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Cause of Property Damage and Injuries

(1 of 3)

- Code violations
- Compartmentation
- Detection and alarm systems
- Fire suppression
- Fuel load and geometry
- Housekeeping

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Cause of Property Damage and Injuries

(2 of 3)

- Human behavior
- Increase in hazard or change in occupancy
- Structural or system failure
- Ventilation effects

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Cause of Property Damage and Injuries

(3 of 3)

- Additional causes of injury or death include:
 - Toxicity from products of combustion
 - Hazardous materials released as a result of fire
 - Means of egress

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Degree of Human Involvement

(1 of 4)

- Determining responsibility occurs after determining fire cause.
 - May be an act or omission
 - Omission can be deliberate or unintentional
- Responsibility may be attributed even for a fire cause classified as undetermined.

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Degree of Human Involvement

(2 of 4)

- Investigation of responsibility involves:
 - Conducting interview
 - Gathering various reports, records, and data
 - Consulting with technical experts
 - Conducting a failure analysis
 - Considers factors contributing to injuries, loss of life, property damage

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Degree of Human Involvement

(3 of 4)

- Analytic tools used in failure analysis include:
 - Timelines
 - Systems analysis
 - Fault trees
 - Mathematical modeling
 - Heat transfer analysis
 - Egress analysis
 - Fire dynamics analysis

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Degree of Human Involvement

- Tragic fires have (4 of 4)
resulted in building
code changes.
— e.g., changes to exit
codes as a result of
the Cocoanut Grove
nightclub fire of
1942



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Summary (1 of 4)

- Fire cause is the identification of the first fuel ignited, the oxidizer, the ignition source, and the circumstances bringing these factors together.

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Summary (2 of 4)

- There are four classifications of fire cause: accidental, natural, incendiary, and undetermined.
- *Suspicious* is a term that should never be part of the fire investigation lexicon.

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Summary (3 of 4)

- Responsibility involves the identification of acts or omissions that contributed to the start/growth/spread of the fire and the resultant property damage, bodily injury, or death.

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Summary (4 of 4)

- Failure analysis involves application of analytical tools to help identify the acts/omissions and persons or entities associated with responsibility.