Fire Basics

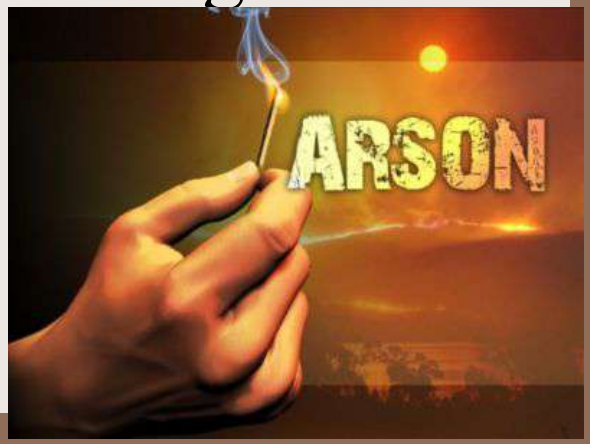
Forensic Science

LEARNING OBJECTIVES

- Discuss the steps in the preliminary investigation of arson
- Be familiar with various types of burn indicators
- Describe ignition devices that may be used in arson
- Assess several common motivations of arsonists for setting fires
- Explain the scientific methods used in arson investigation

Learning Objectives – page 2

- List several groups of people whom an arson investigator should interview
- List questions that investigators should ask in interviews and interrogations
- Explain the two types of explosions
- Outline the procedures for handling and investigating bomb threats

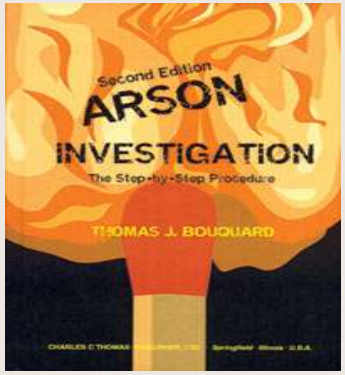


Fire Investigation Terms

- **Fire -** Produced when a substance undergoes rapid oxidation involving heat and light.
- **Fire Triangle** – Shows the three elements needed to produce and sustain a fire.
- **Flash Point** – The lowest temperature to which a substance must be heated in order for the substance to give off vapors which will burn when exposed to a flame or ignition source.
- **Point of Origin** – The location where the fire started.
- **Burn patterns** –Noticeable patterns created by the fire as it burns.
- **Accelerants** – Substances, such as gasoline, paint thinner, and alcohol, that accelerate the burning process.
- **Arson** – A fire started deliberately.

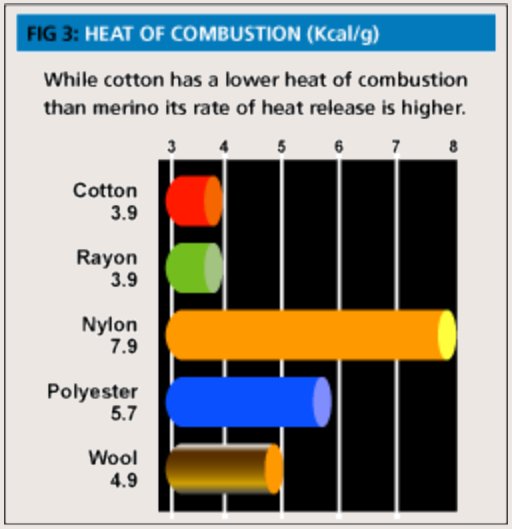
Introduction

- Arson investigations often present complex and difficult circumstances to investigate due to the fact that the perpetrator has thoroughly planned the act, is not present during the act, and the destruction is so extensive.
- The criminalist's function is rather limited to detecting and identifying relevant chemical materials collected at the scene and reconstructing and identifying igniter mechanisms.



The Chemistry of Fire

- Chemically, fire is a type of oxidation, which is the combination of oxygen with other substances to produce new substances.
- To start fire, the minimum temperature needed to spontaneously ignite fuel, known as ignition temperature, must be reached.
- The heat evolved when a substance burns is known as heat of combustion.



The Chemistry of Fire

- An additional factor, besides the liberation of energy, needed to explain fire is the rate or speed at which the oxidation reaction takes place.
- A fuel will achieve a reaction rate with oxygen sufficient to produce a flame only when it is in the gaseous state.

The Chemistry of Fire

- A liquid burns when the temperature is high enough to vaporize it (flash point), while a solid must be hot enough to decompose into gaseous products (pyrolysis).
- Glowing combustion or smoldering is burning at the fuel-air interface, such as a cigarette.
- Spontaneous combustion, which is rare, is the result of a natural heat-producing process in poorly ventilated containers or areas.

The Chemistry of Fire

To initiate and sustain combustion the following is required:

1. **A fuel must be present;**
2. **Oxygen must be available in sufficient quantity to combine with the fuel;**
3. **Heat must be applied to initiate the combustion, and sufficient heat must be generated to sustain the reaction.**

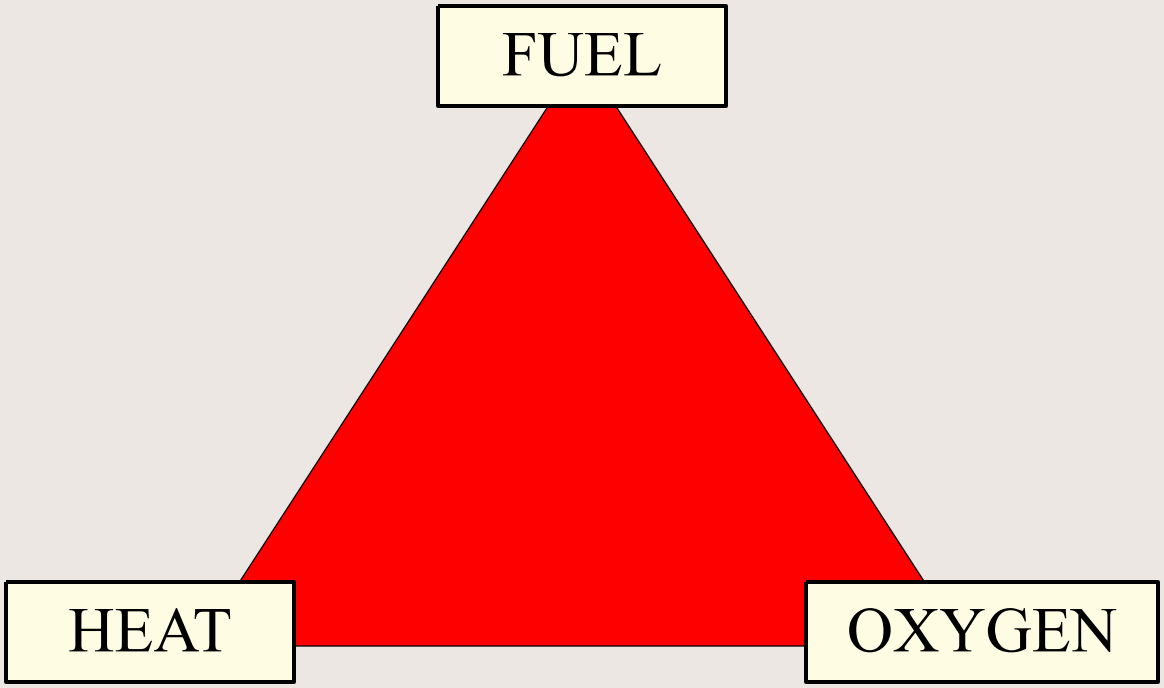
Heat Transfer

The three mechanisms of heat transfer are conduction, radiation, and convection.

- Conduction is the movement of heat through a solid object.
- Radiation is the transfer of heat energy by electromagnetic radiation.
- Convection is the transfer of heat energy by the movement of molecules within a liquid or gas.

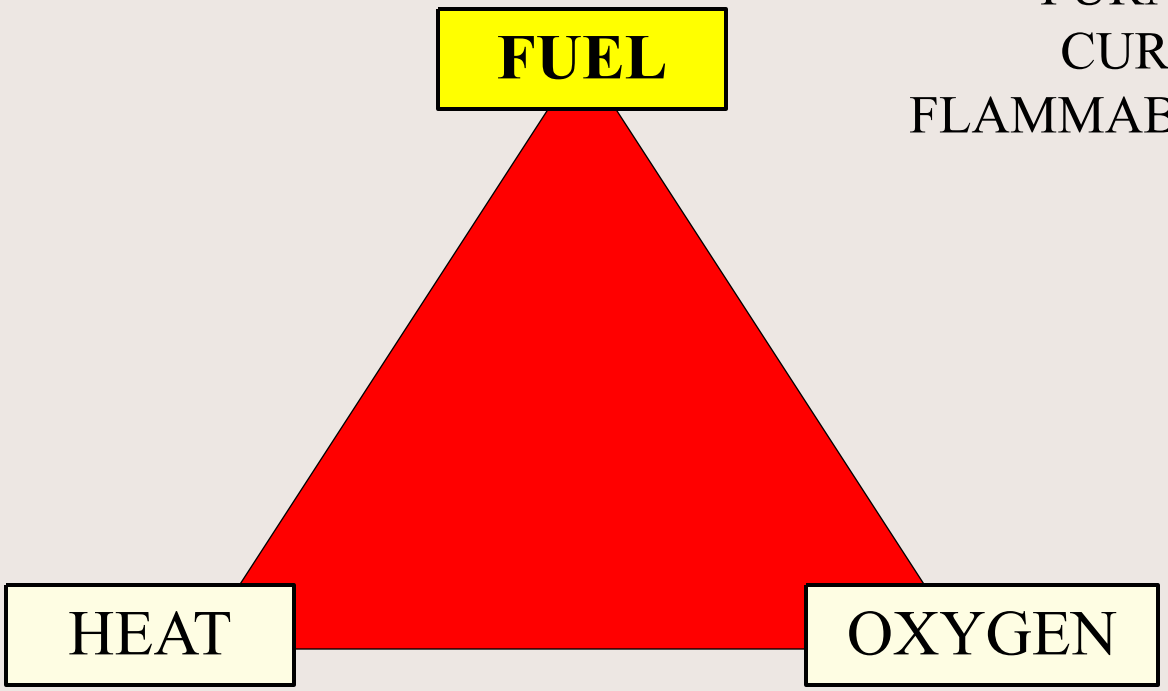
Fuel + Oxygen + Heat = Fire

The **FIRE TRIANGLE** represents the **three** elements needed for fire to occur: heat, fuel, and oxygen.

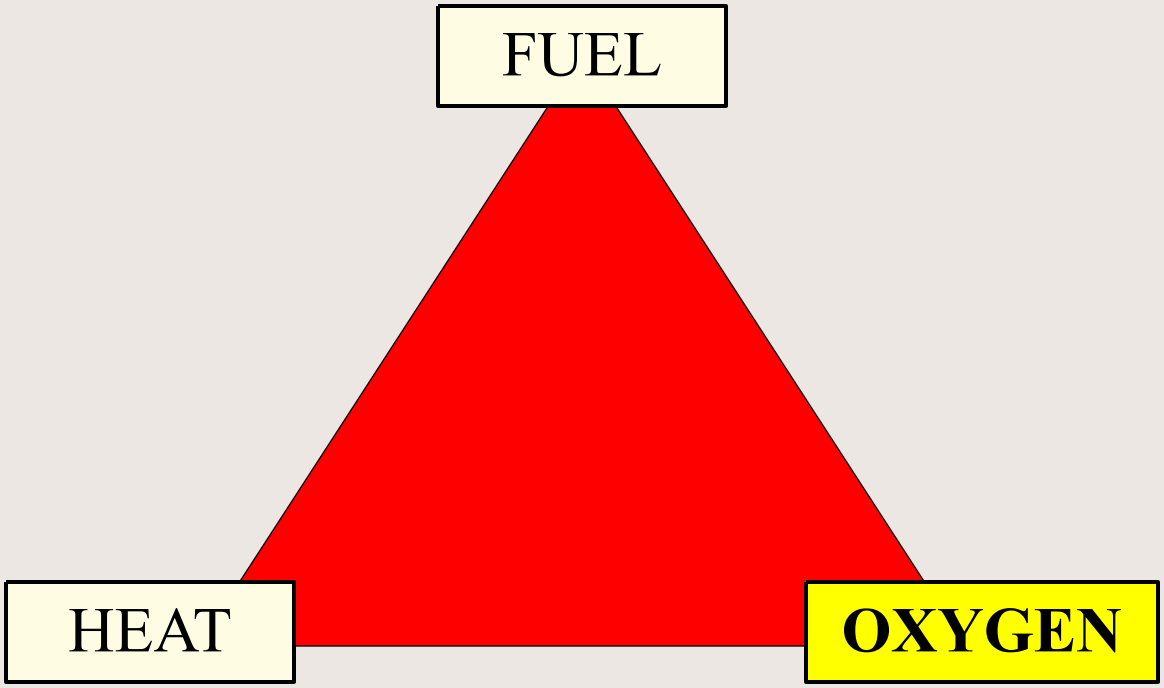


Fuel can be any **combustible material** in **any state of matter** - solid, liquid, or gas. Most solids and liquids become a **vapor or gas** before they will burn.

Examples:
CLOTHING
FURNITURE
CURTAINS
FLAMMABLE LIQUIDS



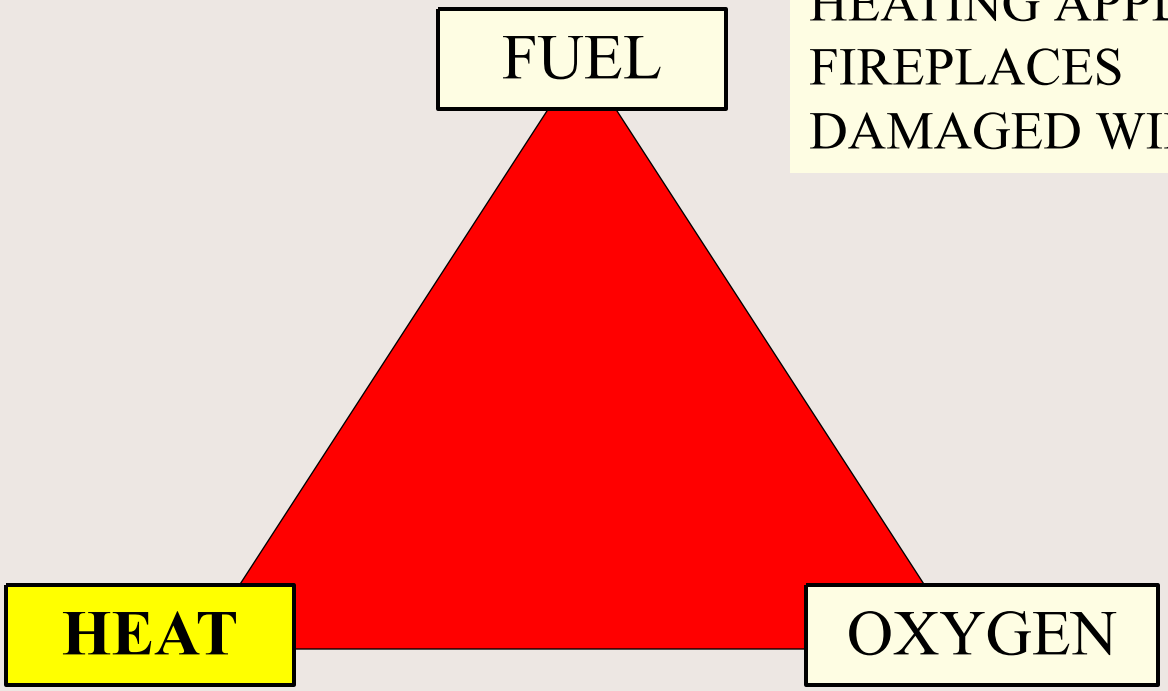
The air we breathe is about **21% oxygen**. Fire requires an atmosphere with at least **16% oxygen**.



Remember: Fuel + Oxygen + Heat = Fire

Heat is the energy necessary to **increase the temperature of the fuel** to a point where sufficient vapors are given off for **ignition** to occur.

Examples:
STOVES
HEATING APPLIANCES
FIREPLACES
DAMAGED WIRING



Fire Clues

- **Point of Origin** – Burn patterns and other damage can help determine the point of origin, or the location where the fire started.
- **Char Patterns** – Created by very hot fires that burn very quickly and move fast along its path, so that there can be sharp lines between what is burned and what isn't.
  - A char pattern on a door would help an investigator determine which side of the door the fire was on.
  - A char pattern on the floor would help investigators determine the use of an accelerant and its path.

Fire Clues

- **V-Patterns** - Fire burns up, in a V-shaped pattern, so a fire that starts at an outlet against a wall leaves a char pattern that points to the origin.
  - A very narrow V-shape might indicate a fire that was hotter than normal, such as one helped along by an accelerant.
  - A wide V-shape might indicate a fire that was slow burning.
  - A U-shape could indicate that there was a "pool of origin" rather than a point of origin, such as might be caused by, say, a puddle of gasoline.

- **Heat Shadows** - Occur when heavy furniture shields part of a wall; can help determine the origin point.
- **Glass -** Glass fragments, windows, and light bulbs can provide clues to a fire.
  - Light bulbs tend to melt toward the heat source, so the "direction of melt" can indicate the direction of the fire.
  - The shattered or cracked glass of the windows can provide indications as to how a fire burned.
  - A dark soot layer on the glass could indicate a slow, smoldering fire.
  - Clear glass with an abnormal pattern of cracking could imply a very hot fire, possibly due to an accelerant.
- **Chimney Effect** - Since fire burns upwards, there can be a "chimney effect" where the fire ignites at a point, the superheated gases rise upward and form a fireball, which continues straight up to burn a hole in the ceiling. If the roof is not entirely burnt, and the fire investigator finds such a hole, the origin of the fire could be directly underneath.
- **Color of smoke** – Determine what type material was burning
- **Color of flames** – Indicates at what temperature the fire was burning.

Fire Investigation Basics

- Work from the least damaged areas to the most heavily damaged areas.
- Document with notes, photographs, and videos.
- Collect evidence (accelerant samples, fire items, and other crime scene evidence.)
- Interview witnesses
- Determine the point of origin.
- Determine the heat source(s).
- Hypothesize the reasons for the fire.

The Fire Scene

- The arson investigator needs to begin examining a fire scene for signs of arson as soon as the fire has been extinguished.
- Experience shows that most arsons are started with petroleum-based accelerants.
- The necessity to begin an immediate investigation even takes precedence over the requirement to obtain a search warrant.

The Fire Scene

- The search of the fire scene must focus on finding the fire's origin, which may be most productive in any search for an accelerant or ignition device.
- Fortunately, combustible liquids are rarely entirely consumed during a fire.

The Fire Scene

- Some telltale signs of arson include evidence of separate and unconnected fires, the use of "streamers" to spread the fire from one area to another, and evidence of severe burning found on the floor as opposed to the ceiling of a structure, due to a flammable liquid.
- Normally, a fire has a tendency to move in an upward direction, and thus the probable origin will most likely be the lowest point showing the most intense characteristics of burning.

Havana – Laurel Street
Practice Burn Photographs

What clues might a fire investigator gain from this photograph?

Havana – Laurel Street
Practice Burn Photographs

Practice Burn Photographs

A fire started in the kitchen area does not take long before it is a ball of flame reaching quickly to the ceiling.

Fires can easily double in size every 60 seconds, meaning there is little time to extinguish a fire before escape should be your primary goal if trapped.

Fire fighters look on as the fire spreads across a room.

The house is nearly completely consumed.

Source: http://www.ci.east-grand-forks.mn.us/fire/gallery/burn/burn.htm

Accident or Arson?

- **Accidental Nature**
  - Heating System
  - Electrical appliances
  - Lightning
  - Children playing with matches
  - Smoking
- **Non-Accident**
  - Odors – Gas, kerosene, or other accelerants
  - Furnishing – Removal of personal objects and valuables
  - Clothing – Check debris for buttons, zippers, etc
  - Locked windows, blocked doors
  - Two or more points of origin
  - Look for inverted v-patterns (can be a sign that an accelerant was used)
  - Floors charred –Can indicate use of an accelerant
  - Trailers that lead the fire from one place to another

Image: Havana Rural Fire Department

Arson Facts in America

According to the FBI Crime Index, juvenile and adult arson cause an annual average of 560,000 fires, 750 deaths, 3,700 injuries, and $1.5 billion in property loss. 55% of all arson arrests in the US are children under 18.

What are Common Motives for Arson?

- **Crime concealment**: To conceal another crime such as murder, burglary, or vehicle.
- **Revenge or spite**: To get back at someone for a perceived injustice.
- **Monetary Gain**: Arson-for-Profit fires are set to burn a building, vehicle, or some other object in order to gain profit from the fire. The profit may come in several forms; from insurance coverage on the property, or from putting a competitor out of business.
- **Malicious Vandalism**: Fire set to someone's property, just to destroy it. Malicious vandalism fires account for the largest percentage of arson fires. These fires are frequently set by juveniles.
- **Mentally Disturbed**: Some persons have been found to have an irresistible impulse to set fires.

Source: http://www.state.il.us/osfm/Arson/ArsonIsAFelonyCrime.htm

Juvenile Firesetting

Fires set by juveniles are usually the result of a child or teenager experimenting with fire with a lack of understanding of the consequences. Others fires may be started by troubled children as a "cry for help" or as acts of vandalism.

The facts ... In Rochester, New York, a two year old, playing with matches, started a fire that took his life and the lives of five family members.

In Passaic, New Jersey, a firefighter was killed and hundreds of people lost their homes in a fire started by a group of teenage boys.

These tragic events are not isolated incidents. In a typical year, in the U. S., 300 people are killed and $190 million in property is destroyed in fires set by children. Children themselves are usually the victims of these fires accounting for 85 of every 100 lives lost.

Source: http://www.usfa.dhs.gov/downloads/txt/publications/l-240.txt

Arson Charges in Illinois

ARSON - Felony - Up to $25,000 fine &/or 3 to 7 Years in jail

A person commits arson when, by means of fire or explosive, he knowingly: (a) Damages any real property, or any personal property having a value of $150 or more, of another without his consent; or (b) With intent to defraud an insurer, damages any property or any personal property having a value of $150 or more.

AGGRAVATED ARSON - Felony - Up to $25,000 fine &/or 6 to 30 Years in jail

A person commits aggravated arson when in the course of committing arson he knowingly damages, partially or totally, any building or structure, including any adjacent building or structure, and (1) he knows or reasonably should know that one or more persons are present therein or (2) any person suffers great bodily harm, or permanent disability or disfigurement as a result of the fire or explosion or (3) a fireman or policeman who is present at the scene acting in the line of duty, is injured as a result of the fire or explosion.

Source:
http://www.state.il.us/osfm/Arson/Statutes.doc

RESIDENTIAL ARSON - Felony - Up to $25,000 fine &/or 4 to 15 Years in jail

A person commits the offense of residential arson when, in the course of committing an arson, he or she knowingly damages, partially or totally, any building or structure that is the dwelling place of another.

What can you do to help prevent arson or arson damage?

- Report suspicious persons and activities that may result in arson.
- If you have a friend or classmates that has set fires in the past or plans to set a fire, tell an adult – parent, teacher, counselor, police officer, or a fireman.
- Start or participate in a community watch program with your parents.
- Install and properly maintain fire alarms in your home and encourage friends and relatives to do the same. Your family should also have a fire escape plan for your home.

Collection

- At the suspect point of origin of a fire, ash and soot, along with porous materials which may contain excess accelerant, should be collected and stored in airtight containers, leaving an airspace to remove samples.

Collection

- Traces of flammable liquid residues may be located with a vapor detector (sniffer).
- It is important that a sampling of similar but uncontaminated control specimens be collected.
- A search for igniter's such as matches, an electrical sparking device, or parts of a “Molotov cocktail” must also be conducted.

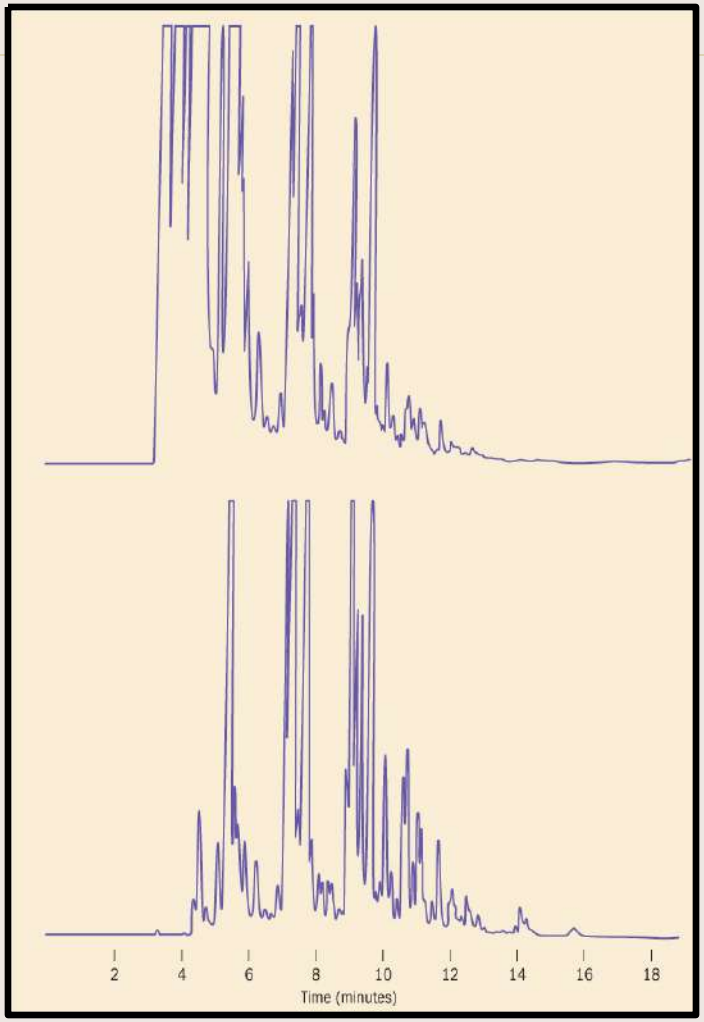
Collection by Live Sniffers

Gas Chromatography

- In the laboratory, the gas chromatograph is the most sensitive and reliable instrument for detecting and characterizing flammable residues.
- The vast majority of arsons are initiated by petroleum distillates such as gasoline and kerosene.

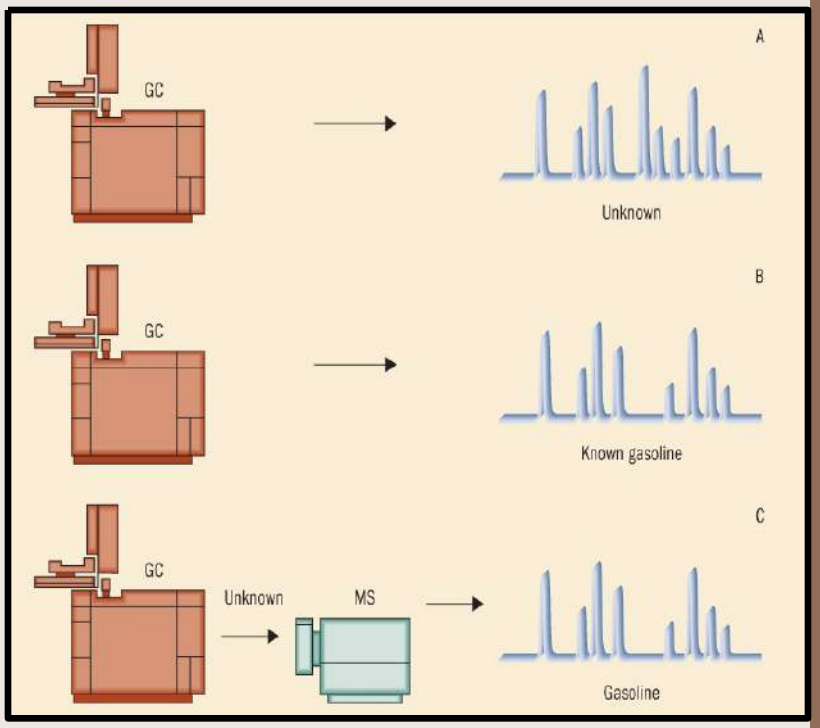
Gas Chromatography

- The gas chromatograph separates the hydrocarbon components and produces a chromatographic pattern characteristic of a particular petroleum product.



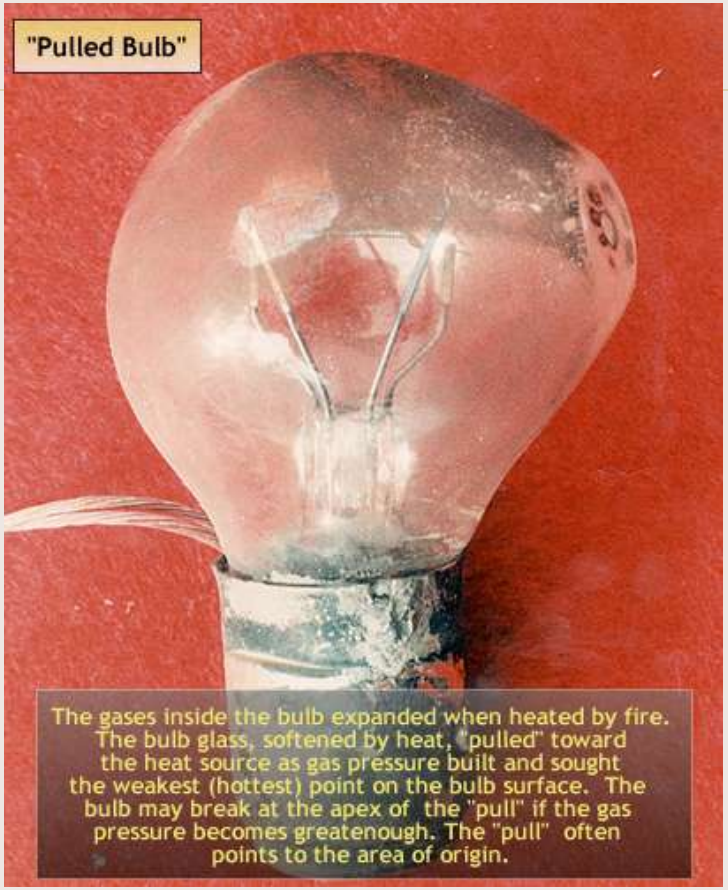
Gas Chromatography

- By comparing select gas chromatographic peaks recovered from fire-scene debris to known flammable liquids, a forensic analyst may be able to identify the accelerant used to initiate the fire.



"One of the major objectives of a fire scene examination is the recognition, identification and analysis of fire patterns."

NFPA 921 (2004)
4.1



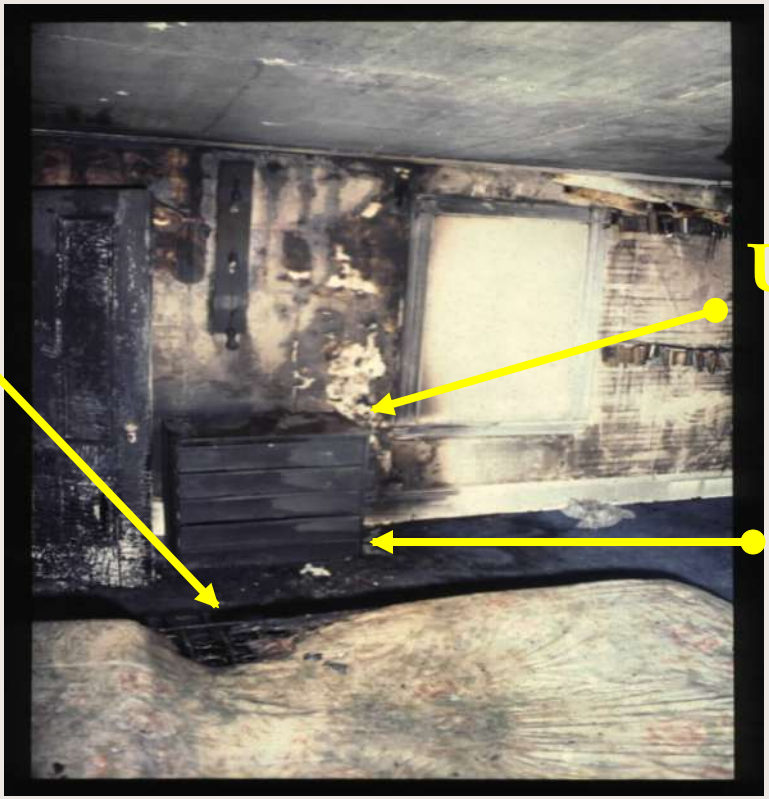
Success in Recognizing Arson begins with recognizing possible Arson Fire Patterns

NFPA 921 on Fire Patterns

- Holes in the floor may be caused by glowing combustion, radiation or an ignitable liquid.
- There is no justification that the appearance of large, curved blisters is an exclusive indicator of an accelerated fire.
- The presence or absence of spalling should not, in and of itself, be construed as an indicator of the presence or absence of a liquid fuel accelerant.
- Inverted cone patterns have been interpreted as proof of flammable liquid fires, but any fuel source that produced flame zones that do not become vertically restricted can produce inverted cone patterns.

First!

Search for Odd Variations in Fire Patterns



Witnesses Reported:

Odor of Gasoline!

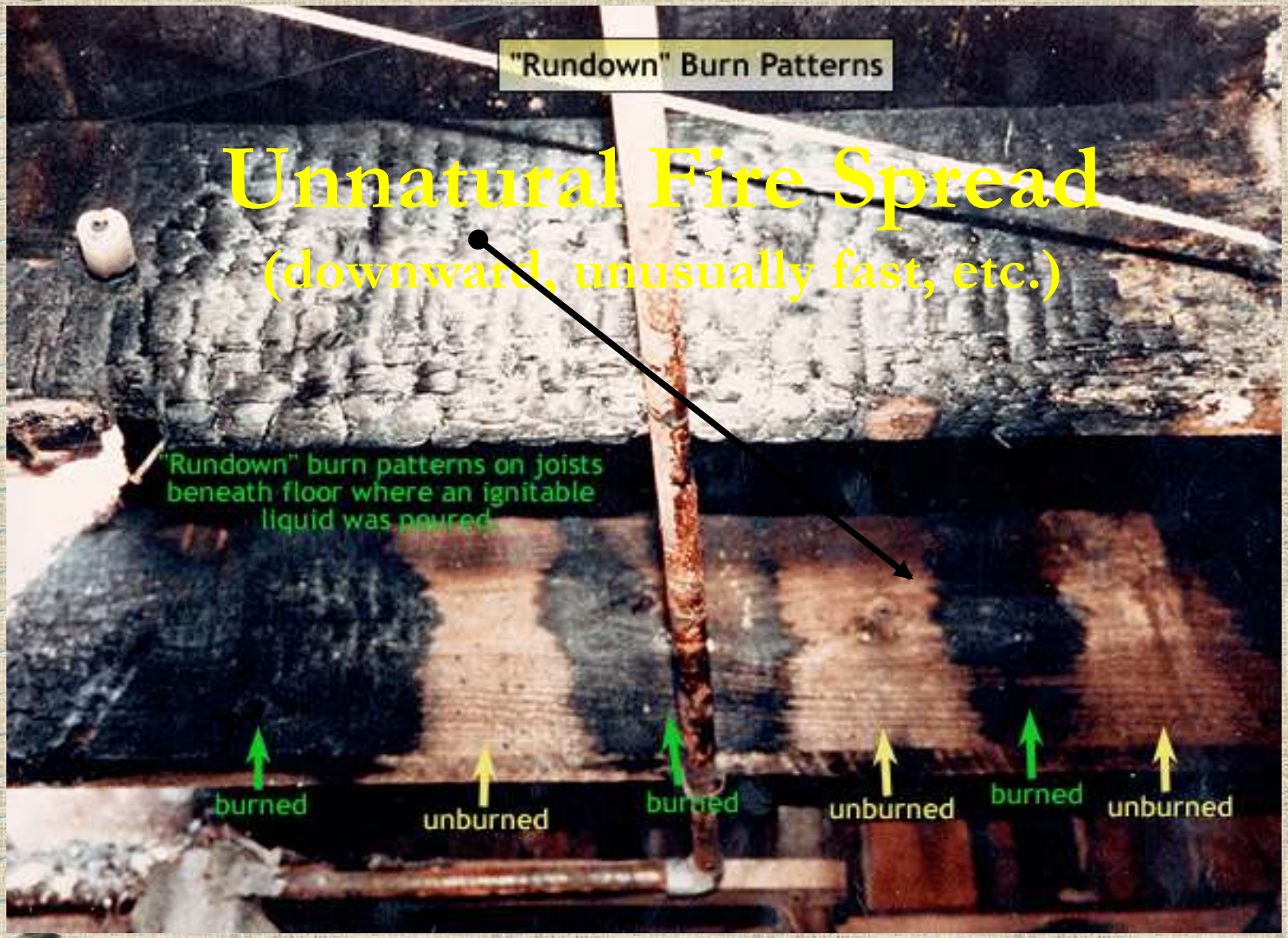
A low pressure wave!

Furniture moved before fire!

Symptoms of Ignitable Liquid Use

(*Possible indicators of an accelerated fire)*

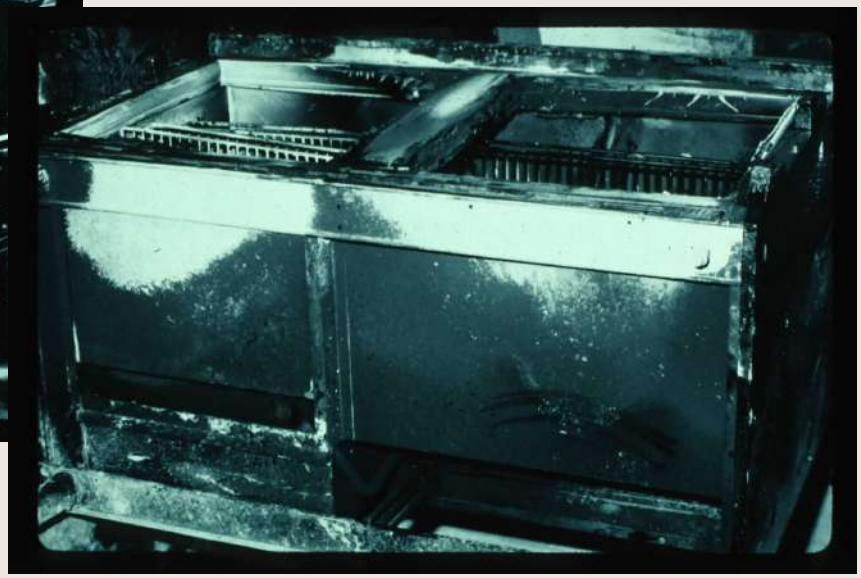
Burn injuries to the hands, face, legs or hair of a suspect/witness.

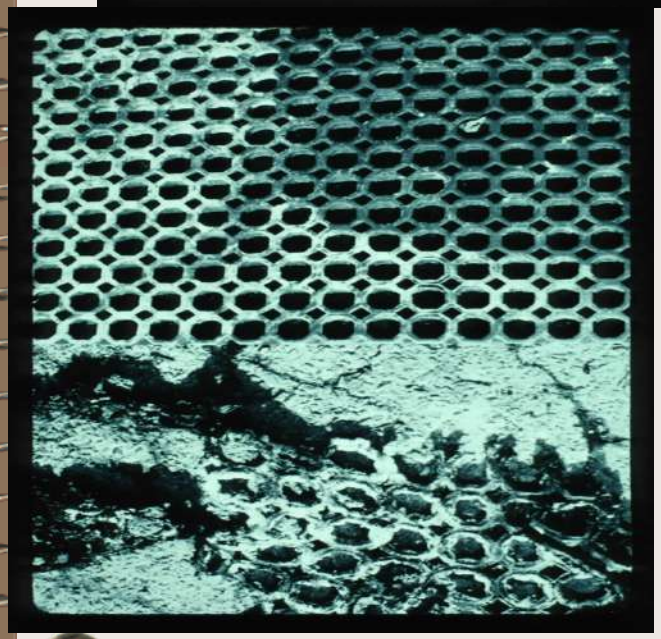

"Rundown" Burn Patterns
Unnatural Fire Spread
(downward, unusually fast, etc.)
"Rundown" burn patterns on joists beneath floor where an ignitable liquid was poured
burned
unburned
burned
unburned
burned
unburned

"Unnatural" Fire Damage

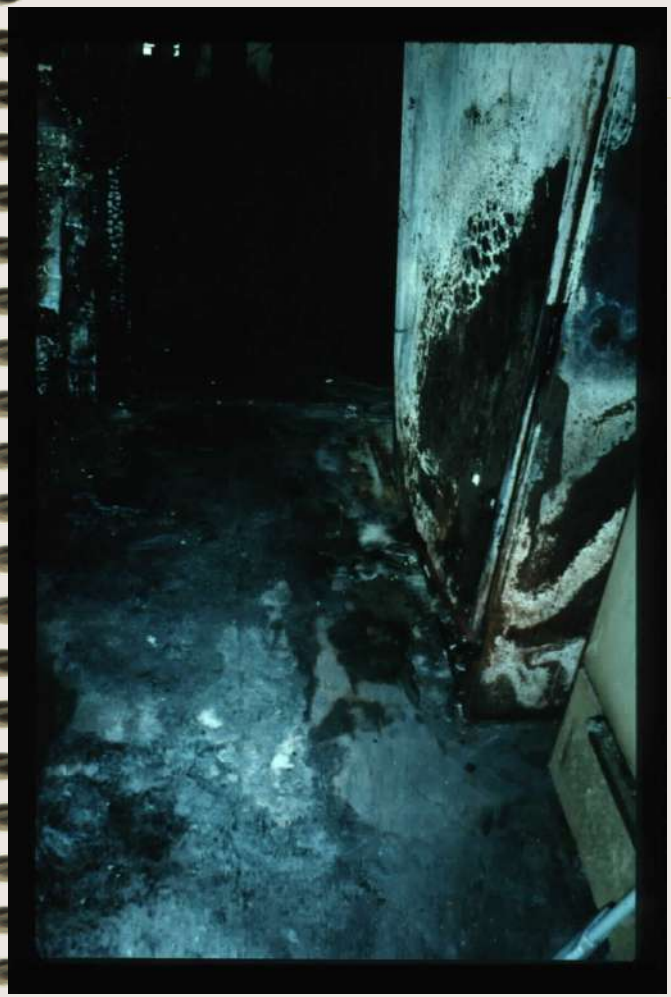
One gallon of gasoline was poured here!

Bright yellow/orange flames accompanied by black smoke.





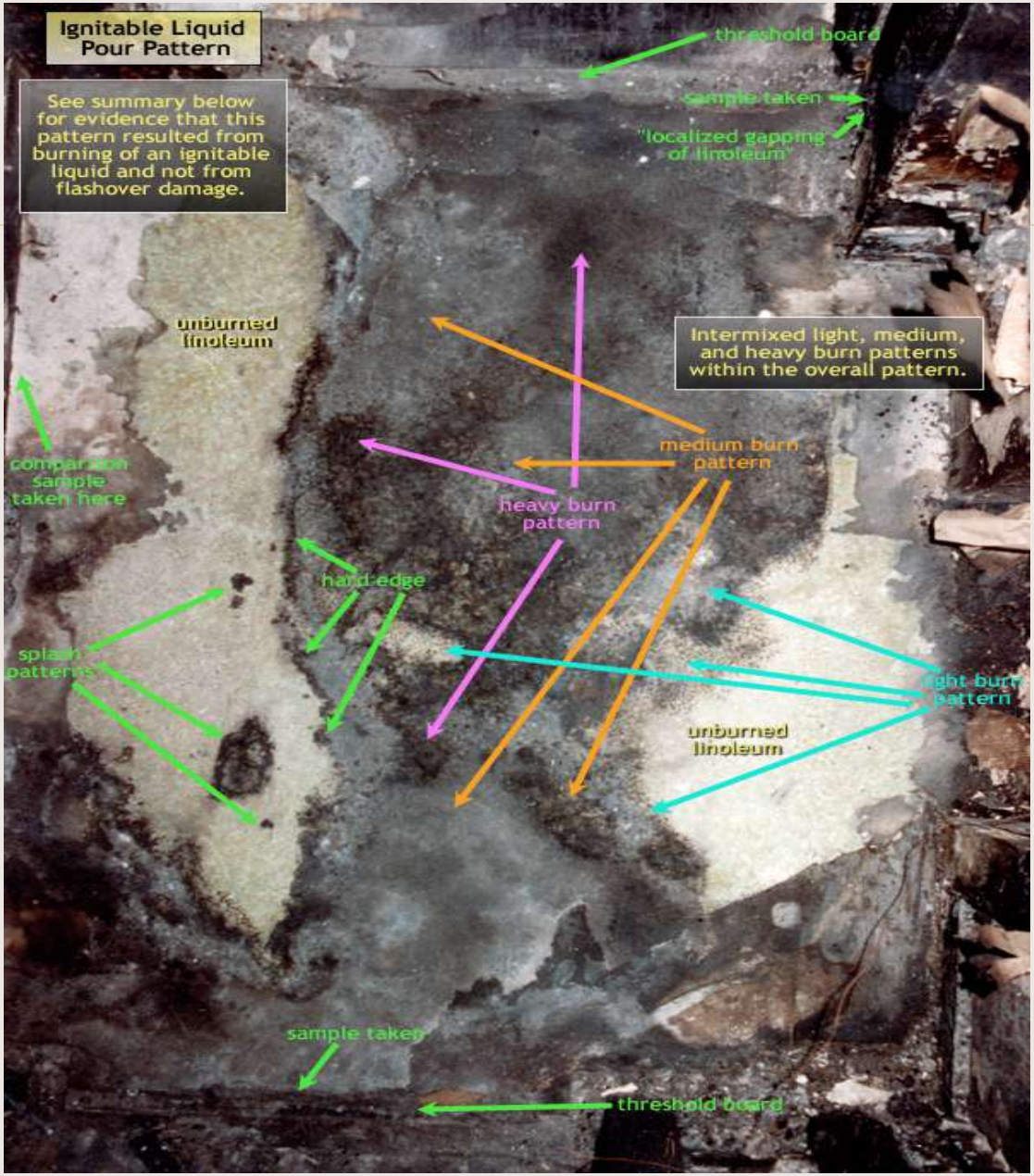
Intense localized rusting/warping, especially to the undersides of metal objects within the pattern

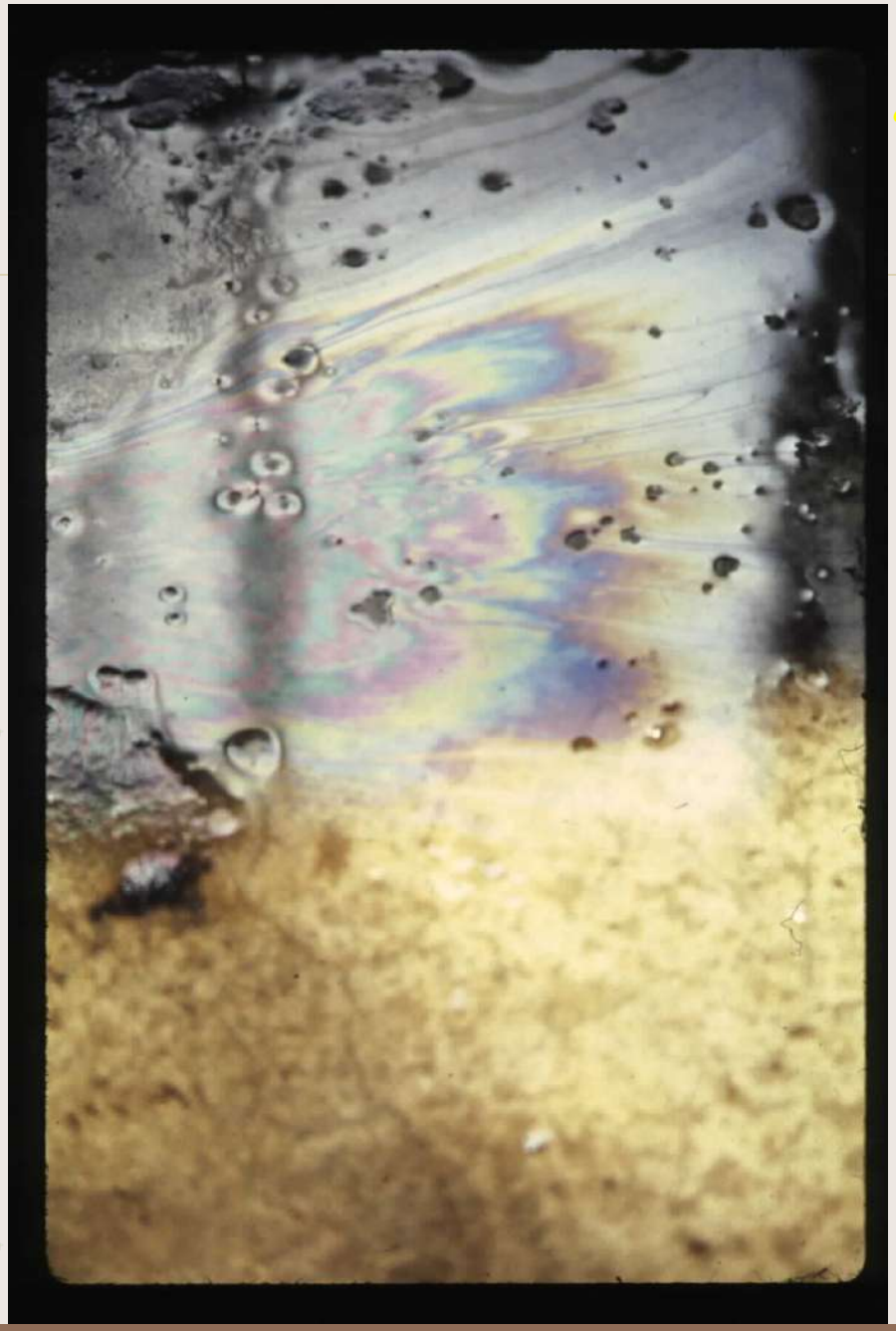


Intense localized rusting/warping, especially to the undersides of metal objects within the pattern

Structural damage inconsistent with fire loading

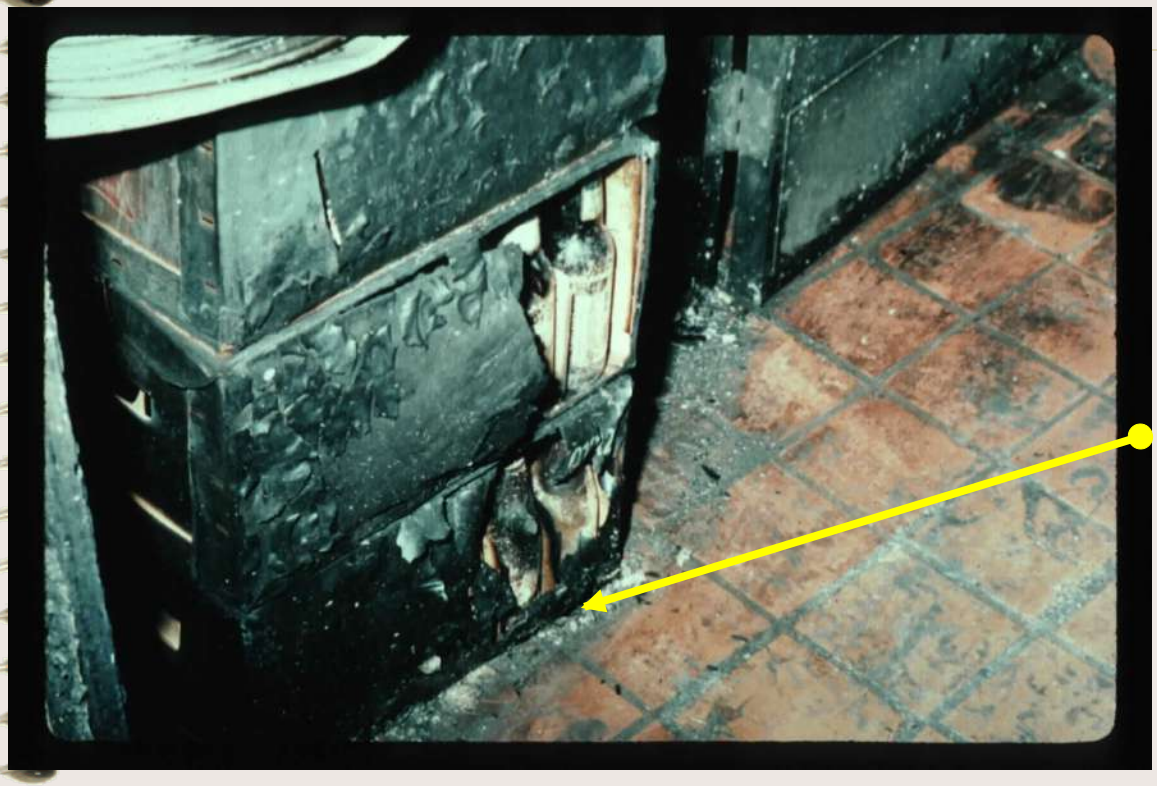
Intermixed light, medium & heavy burn patterns within the overall pattern





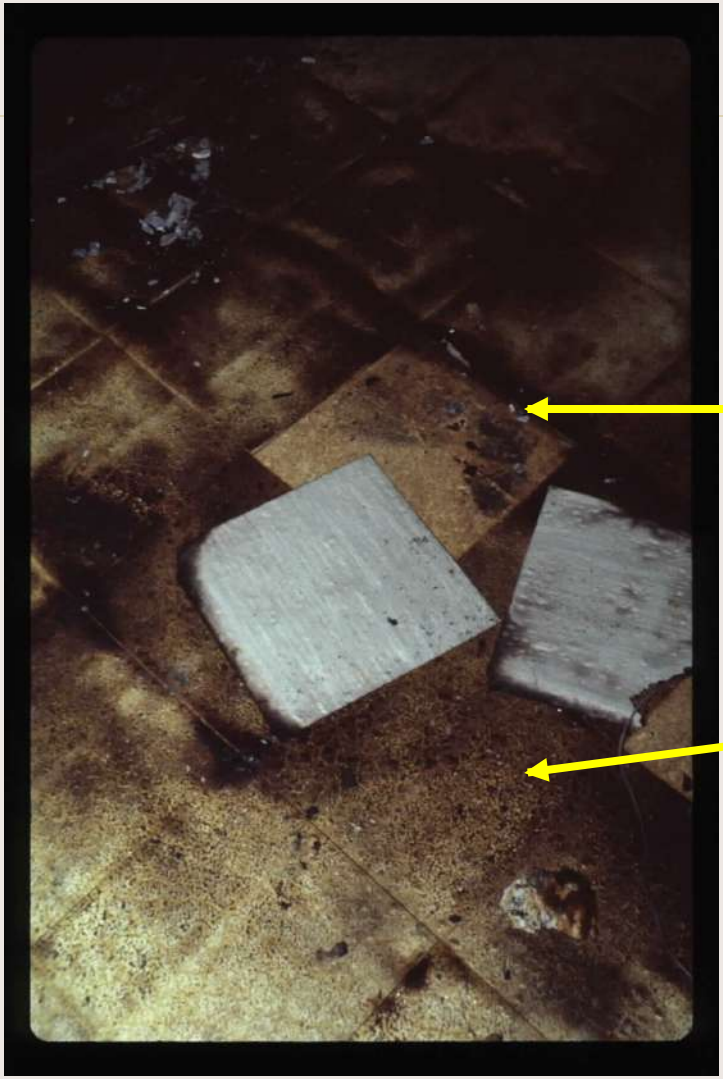
"Rainbow-colored"
sheen
on the surface
of
suppression water
over the
pour area.

Accelerant containers in or near the scene.



Increased
burn damage
pattern
at the
bottom of boxes,
furniture legs, etc.

Pool shaped, intermixed, mottled black and brown staining
on concrete
together with a tendency to repel water.



"Ghost marks"
between seams
of floor tiles
within the pour area.

Localized “clean burn”area
on a wall or appliance
above a pattern
where intense heat
burned away
soot deposits.


Inverted Cone Patterns
(ignitable liquid was
poured across floor)

"Inverted Cone"
fire pattern

Search for the soot plume!

Key Properties of Common Ignitable Liquids

- Behave like any liquid before ignition.
- Most float on water, are immiscible, rainbow
- Form explosive vapors at room temperatures
- Vapors are heavier than air
- Readily absorbed
- Powerful solvents
- Don’t spontaneously ignite
- Explosive Limits/Ignition Temperature
- Sampling the accelerant fire pattern

Related Physical Evidence

- The Accelerant Container
- Other instrumentalities (i.e. ignition device)
- Changing the arrangement of combustibles to increase fire loading
- Propping open doors & windows
- The ignition device
- Explosion/Deflagration?
- Burn patterns and the burned “perp”

Arson Scene – Accelerant Detection Canine Unit - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://www.interfire.org/training/canineflash.asp Go Links

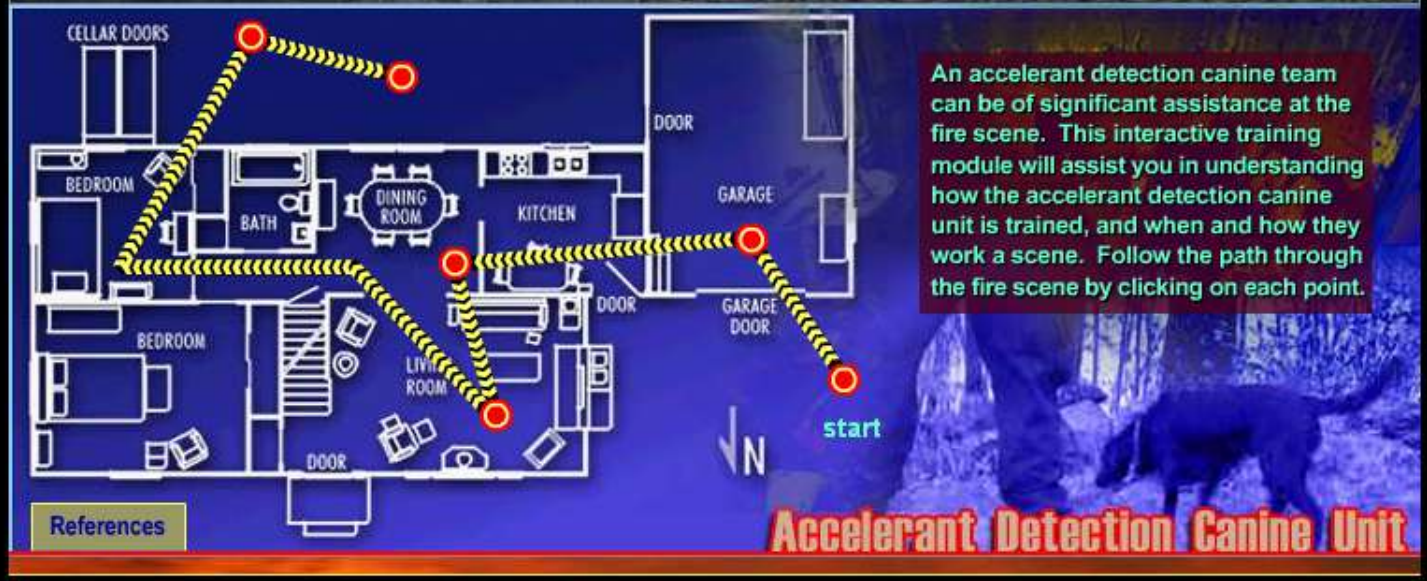
Search Web Mail Personals Games Music My Yahoo! Sign In

interFIRE online

Home | interFIRE VR Support | Training Calendar | Training Center | Resource Center | Message Board | Insurance Info

Search GO! Get interFIRE updates >> Click here for "Term of the Week"

Training Center



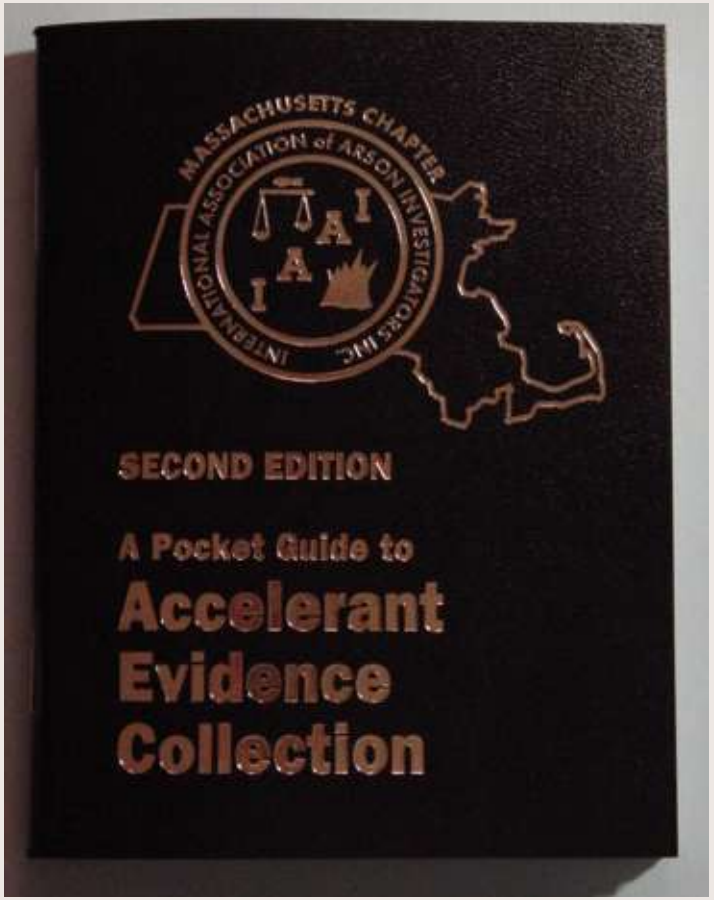
Done Internet

Accelerant Detection K-9 Teams are very **important** especially in large loss fires.

A Pocket Guide to Accelerant Evidence Collection, 2nd Edition

- Cited as a reference in all editions of NFPA 921, Kirk's Fire Investigation 5th Edition, interFIRE VR

- Go to www.maiaai.org for more information



PRELIMINARY INVESTIGATION

- One effective way to determine fire causes is to determine the point of origin
- The investigator should check for the level of origin by examining:
  - the bottoms of shelves, ledges, moldings
  - furniture and all sides of the legs, arms, and framework of reconstructed furniture
- The floor and lower areas of the room produce the most clues to the cause for the fire, because they are living area

WHERE AND HOW DID THE FIRE START?

- Two Factors Needed to Cause Fire
  - During the investigation, it should be borne in mind that a fire always has two causes: a source of heat and material ignited
- Accidental Fires
  - Once the point of origin has been discovered the next step is to determine how the fire started
  - Even though arson may be suspected, the investigator must first investigate and rule out all possible accidental or natural causes

COMMON CAUSES FOR ACCIDENTAL OR NATURAL FIRES

- The electric system
- Electrical appliance and equipment
- Gas
- Heating units
- Sunlight
- Matches
- Smoking

SPONTANEOUS HEATING

- An increase in temperature that results from a natural process; caused by chemical action, fermentation, or exidation

Heats of Combustion of Cycloalkanes

Cycloalkane	kJ/mol	Per CH_2
Cyclopropane	2,091	697
Cyclobutane	2,721	681
Cyclopentane	3,291	658
Cyclohexane	3,920	653
Cycloheptane	4,599	657
Cyclooctane	5,267	658
Cyclononane	5,933	659
Cyclodecane	6,587	659

see Table 3.1 (p 94) for additional entries

SPONTANEOUS IGNITION

- The catching afire of materials subjected to spontaneous heating; usually requires several hours to several months of oxidation or fermentation

SPONTANEOUS IGNITION

BURN INDICATORS

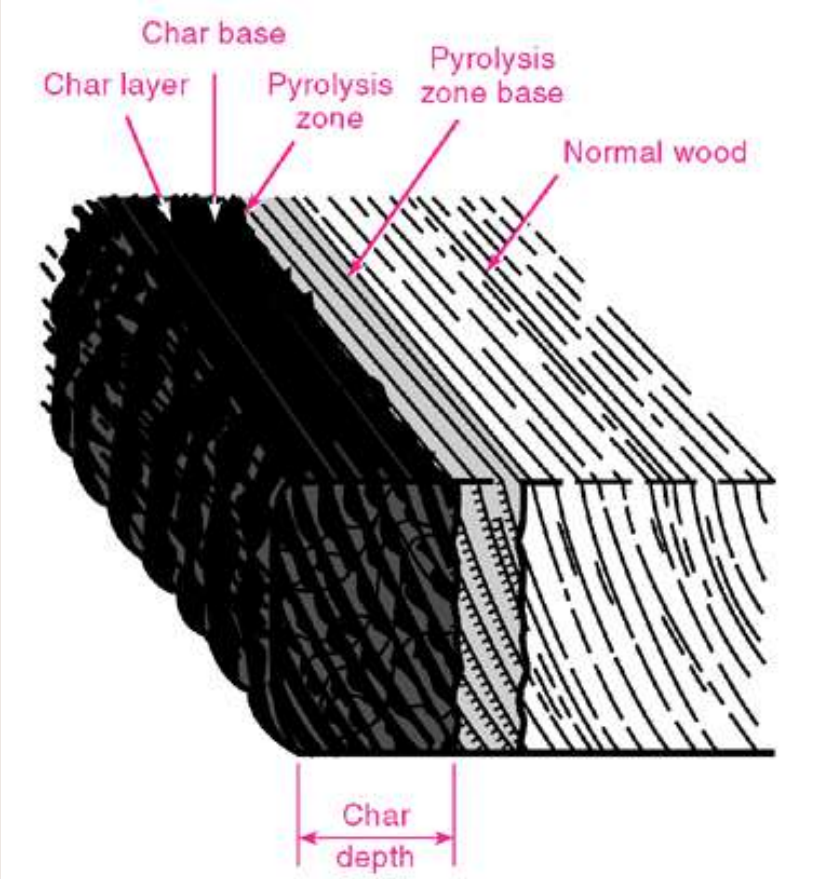
- Burn indicators are the effects of heat or partial burning that indicate a fire's rate of development, points of origin, temperature, duration, and time of occurrence and the presence of flammable liquids. Interpretation of burn indicators is the principle means for determining the cause of a fire, especially arson

EXAMPLES OF BURN INDICATORS

- Alligatoring
- Depth of char
- Breaking of glass
- Collapsed furniture springs
- Spalling
- Distorted light bulbs
- Temperature determination

LINE OF DEMARCATION IN A WOOD SECTION

- Depth of char
  - is used for evaluating fire spread
  - is used to estimate the duration of a fire
  - the rate of charring of wood varies widely



(Source: Factory Mutual Engineering Corporation, Norwood, Massachusetts. Reprinted with permission.)

APPROXIMATELY MELTING TEMPERATURE OF COMMON MATERIALS

- Arson investigators use charts such as the one on the next two slides to determine the approximate melting temperature of a material
- Arson investigators try to estimate the temperature to which melted material was subjected
  - this helps to evaluate the intensity and duration of heating

APPROXIMATELY MELTING TEMPERATURE OF COMMON

Material	°F	°C
Aluminum (alloys)	1,050-1,200	566-650
Aluminum	1,220	660
Brass (yellow)	1,710	932
Brass (red)	1,825	996
Bronze (aluminum)	1,800	928
Cast iron (gray)	2,460-2,550	1,350-1,400
Cast iron (white)	1,920-2,010	1,050-1,100
Chromium	3,350	1,845
Copper	1,981	1,082
Fire brick (insulating)	2,980-3,000	1,638-1,650
Glass	1,100-2,600	593-1,427
Gold	1,945	1,063
Iron	2,802	1,540
Lead	621	327
Magnesium (AZ31B alloy)	1,160	627

(Source: National Fire Protection Association, NFPA 921 Guide for Fire and Explosion Investigations (Quincy, MA: NFPA, 2001), pp. 921-30.)

APPROXIMATELY MELTING TEMPERATURE OF COMMON MATERIALS

Material	°F	°C
Plastics (thermo):		
ABS	190-257	88-125
Acrylic	194-221	90-105
Nylon	349-509	176-265
Polyethylene	251-275	122-135
Polystyrene	248-320	120-160
Polyvinylchloride	167-221	75-105
Platinum	3,224	1,773
Porcelain	2,820	1,550
Pot metal	562-752	300-400
Quartz (SiO_2)	3,060-	1,682-
Silver	3,090	1,700
Solder (tin)	1,760	960
Steel (stainless)	275-350	135-177
Steel (carbon)	2,600	1,427
Tin	2,760	1,516
Wax (paraffin)	449	232

IGNITION DEVICES

- Matches. Juvenile arsonists and pyromaniacs seem to favor striking matches
- Gasoline. Gasoline and other accelerants are very popular with many different types of arsonists
- Chemicals. Various chemical combustions have been used to set fires

IGNITION DEVICES (cont'd)

- Gas. The combination of gas and the pilot light on the kitchen stoves of many residences is always a possibility
- Electrical Systems. Any wiring system, including doorbell and telephone circuits, can be used as a fire-setting tool
- Mechanical Devices. Alarm clocks were once a favored weapon of arsonists

ARSON DEVICE

- The items used in this arson igniting device included:
  - an electrical timer
  - an appliance cord
  - matches
  - shredded paper

(Courtesy Property Claim Services, American Insurance Association)

PLANT

- In arson, the material placed around the ignition device to feed the flame

ACCELERANTS

- In fire starting, any flammable fluid or compound that speeds the progress of a fire. Also called a booster.

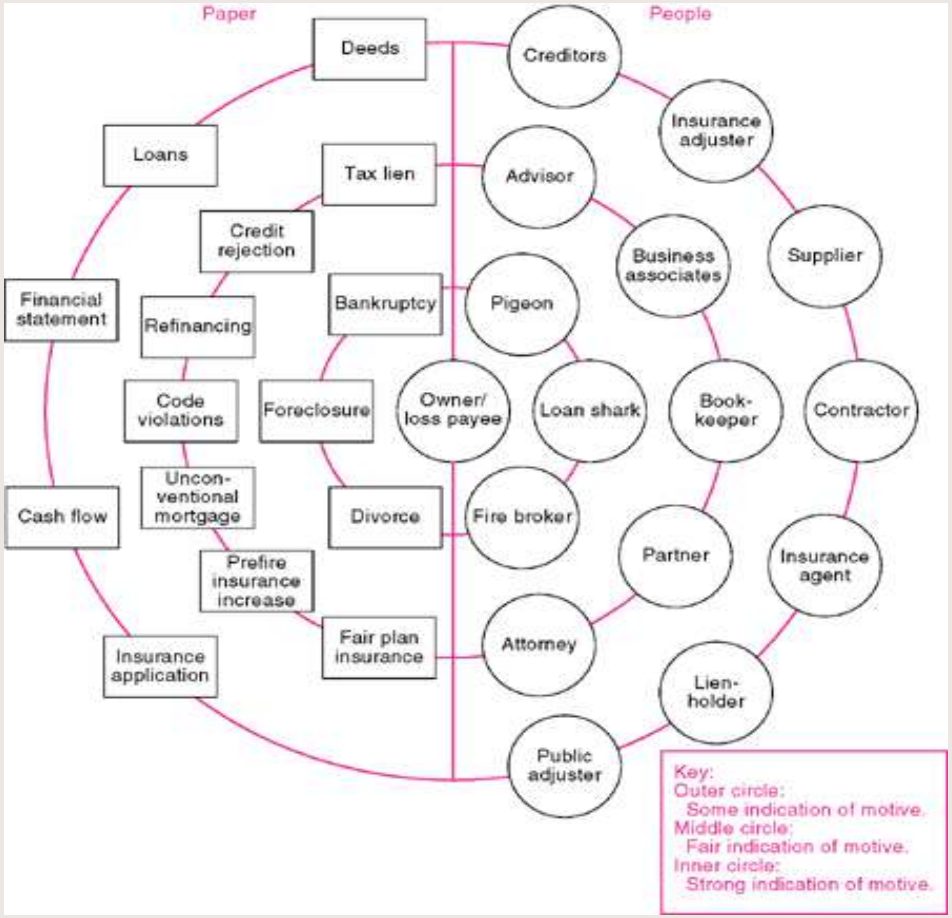
COMMON MOTIVATIONS FOR ARSON

- Arson-for-profit
- Revenge, spite, jealousy
- Vandalism/malicious mischief
- Racial/religious hostility
- Crime concealment/diversionary tactics
- Psychiatric afflictions
  - pyromaniac
  - schizophrenic firesetter
  - Vanity, hero fire

ESTABLISHING ARSON FOR PROFIT MOTIVE

- **The investigator may obtain information regarding motives in arson-for-profit primarily from:**
  - **people**
  - **documents**

- **A chart such as the one shown may be useful to the investigator**



(Source: C.L. Karchmer, M.E. Walsh, and J. Greenfield, *Enforcement Manual: Approaches for Combating Arson-for-Profit Schemes* [Washington, DC: U.S. Department of Justice, 1979], p. 31.)

SCIENTIFIC METHODS IN ARSON INVESTIGATION

- Detection of Fire Accelerants. Several types of portable equipment are available to the arson investigator for detecting residues of flammable liquids at fire scenes.
  - Olfactory Detection. The sensitivity of the human nose to gasoline vapor is about 1 part per 10 million.
  - Chemical Color Test Detectors. Chemical color tests may be used to detect both liquid accelerant residues and their vapors.

SCIENTIFIC METHODS IN ARSON INVESTIGATION (cont'd)

- Catalytic Combustion Detectors. The most common flammable vapor detector operates on the catalytic combustion principle.
- Flame Ionization Detector. In the flame ionization detector the sample gas is mixed with hydrogen and the mixture is burned.
- Gas Liquid Chromatograph. The portable gas liquid chromatograph (GLC) is one of the most common detectors in arson investigations.

SCIENTIFIC METHODS IN ARSON INVESTIGATION (cont'd)

- Infrared Spectrophotomer. Infrared spectophotometers can achieve high specificity to flammable liquids and high sensitivity.
- Ultraviolet Fluorescence. This procedure consists of illuminating the darkened fire scene with an ultraviolet lamp.

ACCELERANT DETECTING CANINE

- Many arsonists stay close to the fire scene
- Police dogs may be brought to the scene
- Sometimes these dogs will detect accelerants on a person at the scene

(Courtesy U.S Department of the Treasury Bureau of Alcohol, Tobacco, and Firearms)

INTERVIEWS IN AN ARSON INVESTIGATION

- Possible Witnesses
  - Prospective witnesses include tenants, businesspeople and customers from the burnt building and surrounding buildings
  - Passers-by, including bus drivers, taxi drivers, delivery people, garbage collectors, police patrols, and people waiting for busses and taxis
  - Questions to Ask. Did you observe the fire? At what time did you first observe the fire? are examples of questions asked in an interview

INTERVIEWS IN AN ARSON INVESTIGATION (cont'd)

- Firefighters at the Scene. Firefighters can be an invaluable source of information to arson investigators because of their technical knowledge and because of what they observe at a fire.
  - Questions to Ask. What time was the alarm receive? What time did you arrive at the scene of the fire? are examples of questions to ask firefighters

INTERVIEWS IN AN ARSON INVESTIGATION (cont'd)

- Insurance Personnel. Three people may be interviewed to determine if the profit centers around an insurance claim: the insurance agent or broker, the insurance adjuster, and the insurance investigator.
  - Question to Ask the Agent or Broker. Who is the insured? Is there more than one person insured? Is the insured the beneficiary?
  - Question to Ask the Insurance Claims Adjuster. Did you take a sworn statement from the insured? Did the insured submit documents regarding proof of loss, value of contents, bills of lading, value of building, and the like.
  - Question to Ask the Insurance Investigator. Were you able to determine the cause of the fire? did you collect any evidence?

INTERVIEWS IN AN ARSON INVESTIGATION (cont'd)

- Other Witnesses Concerning Finances of the Insured. A number of other people may have information on the finances of the owner, including business associates, creditors, and competitors.
  - Question to Ask. How long have you known the owner/insured? What is the nature of your relationship with the owner/insured?
- News Media Personnel
  - Individuals affiliated with these groups may have noticed something of value to the investigator or perhaps have films of the fire and fire scene.

INTERVIEWS IN AN ARSON INVESTIGATION (cont'd)

- The Medical Examiner. The autopsy should reveal whether any victim found dead in the fire was dead or alive before the fire started and what the cause of death was.
- Interviewing a Suspect. The questions below are based on the assumption that the person to be interviewed is involved in arson for profit.
  - Questions to Ask the Suspect. Are you willing to cooperate in this investigation? How many other people are involved in the arson-for-profit scheme?
  - Questions to Ask the Torch, Specifically. What method was used to accomplish the arson?

INTERVIEWS IN AN ARSON INVESTIGATION (cont'd)

- Interviewing the Target and the Owner. The target of the investigation may be an owner, landlord, fire broker, or the like.
  - Questions to Ask the Target. Tell me in your own words what you know about this fire. When did you first hear of the arson?
  - Questions to Ask the Owner. Tell me in your own words what you know about this fire. How long have you owned the burned property?
- Interviewing a Potential Informant Who Is Not a Suspect. Investigative efforts should be made to determine if the informant has any police record and, if so, if it could have any bearing on the reliability of the information provided.

THE ARSON SUSPECT

- In some arson investigations, a single prime suspect may emerge and investigative efforts will be focused accordingly
  - In most cases, a number of suspects emerge, and merely establishing that one or more of them had a motive to set the fire is not proof enough for an arrest and conviction
- In probing an arson fire, seldom does direct evidence link a suspect with a fire
  - The investigation often must concentrate on gathering circumstantial evidence and provable facts

Arsonists