Physical Evidence

Knowledge Objectives (1 of 2)
- Understand the importance of physical evidence in a fire investigation.
- Decide what physical evidence to collect at a scene.
- Describe acceptable procedures for protecting and preserving the scene.

Knowledge Objectives (2 of 2)
- Describe acceptable methods for collecting samples of various types of common physical evidence.

Skills Objectives
- Process physical evidence using recommended and accepted methods.

Introduction
- Physical evidence
  - Any physical or tangible item that tends to prove or disprove particular fact or issue
  - Also called real evidence
  - Can be produced in court
- Entire scene is considered physical evidence
- Fire crews should recognize importance of evidence preservation

Physical Evidence (1 of 3)
- Traces of ignitable liquid in flooring
- Tool mark at point of forcible entry
- Faulted electrical circuit
- Fingerprints
- Blood
- Many others
Physical Evidence (2 of 3)
• Fire patterns are also physical evidence.
• Work with law enforcement crime scene evidence technicians.
• Consulting a forensic laboratory technician to package, store, and transport evidence may also be necessary.

Physical Evidence (3 of 3)
• Physical evidence differs from other forms of trial evidence:
  – Direct evidence
  – Demonstrative evidence
  – Circumstantial evidence

Preservation of the Fire Scene and Physical Evidence (1 of 2)
• Ideally, the fire scene should be left intact.
  – Particularly room of fire origin
• Fire investigator decides what to collect
• Skill in recognizing, documenting, collecting, preserving evidence
  – Comes from specialized training
  – Is important capability of investigator

Preservation of the Fire Scene and Physical Evidence (2 of 2)
• Physical evidence is generally found within the area of origin.

Protecting Evidence
• The investigator should be called early.
• Post a fire fighter at the entrance or near the evidence.
• “Tape off” evidence or use evidence cone.
• Notify the incident commander that potential evidence has been discovered.

Role and Responsibility of Fire Suppression Personnel (1 of 2)
• First stage of evidence preservation begins with firefighting operation
• Entire scene should be protected to extent possible
• Avoid certain old-fashioned firefighting operations that can destroy evidence, e.g.:
  – High-pressure water streams
  – Covering evidence with salvage covers
Role and Responsibility of Fire Suppression Personnel (2 of 2)

- Note the position of the knobs on this range.

Roles and Responsibilities of the Fire Investigator (1 of 3)

- Before collecting and removing evidence:
  - Photograph
  - Fix in a diagram indicating location and position
- Field note taking should:
  - Document condition of evidence when discovered
  - List other people present

Roles and Responsibilities of the Fire Investigator (2 of 3)

- The position of evidence (a Molotov cocktail) is documented in this diagram.

Roles and Responsibilities of the Fire Investigator (3 of 3)

- The position of evidence is documented in this photograph.

Contamination of Physical Evidence

- Avoiding contamination is a concern.
- Contamination can occur during:
  - Firefighting
  - Overhaul and salvage operations
  - Evidence handling
  - Transportation
  - Storage

Contamination During Collection

- Most contamination occurs during collection.
  - Referred to as cross-contamination
- Major potential sources
  - Evidence containers
  - Tools
  - Protective equipment such as boots and gloves
  - Emergency equipment
Collection of Physical Evidence (1 of 2)

• Governed by type, form, size, and condition of evidence
• Determine if handling will degrade fragile forms of evidence such as latent fingerprints.
  — Call an evidence technician if in doubt.

Collection of Physical Evidence (2 of 2)

• Collection methods depend on:
  — Physical state (solid, liquid, or gas)
  — Physical characteristics
  — Fragility
  — Volatility
• As a general rule, public fire investigators should not remove appliances, wiring, etc. that have malfunctioned.

Documenting the Collection of Physical Evidence

• Field notes
• Reports
• Sketches, diagrams
• List of evidence removed and names of person(s) collecting evidence
• Information on all parties who took custody

Collection of Traditional Forensic Physical Evidence

• Some examples:
  — Finger and palm prints
  — Bodily fluids
  — Hair and fibers
  — Footwear impressions
  — Tool marks
• Use trained evidence technician if necessary

Collection of Evidence for Accelerant Testing (1 of 2)

• Gasoline and kerosene are most common.
• Examples of liquid accelerant characteristics:
  — Flow downgrade and puddle in low areas
  — Lighter than water, immiscible, and may display “rainbow” coloration
  — Vapors are heavier than air.
  — Can be readily absorbed by structural components
  — Alcohol and acetone tend to “flash and scorch.”
  — Kerosene or turpentine tend to “wick, melt, and burn,” leaving stronger patterns.

Collection of Evidence for Accelerant Testing (2 of 2)

• Better samples may be found in protected areas and inside absorbent materials.
• An accelerant detection canine (AK-9) team can be helpful.
• Special procedures are followed to collect liquid samples for testing.
Collection of Liquid Evidence Absorbed by Solid Materials (1 of 4)
• Maximize laboratory identification of accelerant residues.
  – Observe headspace considerations.
  – Use new, unlined, uncoated steel paint cans with V-groove lids.
  – Place the identification mark or evidence label on the side of the can, not the lid.
  – Sample from the base of absorbent materials placed on a floor.
  – Cut narrow splinter samples from seams and joints.

Collection of Liquid Evidence Absorbed by Solid Materials (2 of 4)
• Maximize laboratory identification of accelerant residues. (cont’d)
  – Attempt to pulverize, shred, or splinter sample residue evidence.
  – Drain excess water from the sample.
  – Advise the staff chemist about any odors.
  – Document the scene before removing any evidence.

Collection of Liquid Evidence Absorbed by Solid Materials (3 of 4)
• Collection of solid samples
  – Call your regional or state crime laboratory for advice if needed
  – Take comparison samples away from the suspected pour pattern or from underneath large objects.
  – Obtain an exemplar, if applicable.
  – Do not perform destructive examinations that exceed your training and experience.

Collection of Liquid Evidence Absorbed by Solid Materials (4 of 4)
• Collection of gaseous samples
  – Do not enter any area where a potentially explosive atmosphere is present.
  – Contact state or federal laboratories for advice.

Collection of Electrical Equipment and Systems Components
• First priority is to make certain there is no electrical current to equipment
  – Call an electrician if in doubt.
• Examine, photograph, document on scene
• Identify any wire cut for collection
  – Device or appliance it is from
  – Circuit breaker or fuse number or location
  – Path between device and circuit protector

Identification of Collected Physical Evidence (1 of 2)
• Photograph where it was found.
• Place into scene drawing.
• Mark for positive identification.
  – On the evidence itself, if this is not destructive
  – Otherwise, tag item or place in bag
Identification of Collected Physical Evidence (2 of 2)

A marked evidence container.

Transportation and Storage of Physical Evidence

- Maintain physical integrity of evidence
- Personal delivery is preferred transport method
- Hazardous evidence cannot be shipped.
- Storage conditions should maintain evidence in best possible condition
- Use letter of transmittal; obtain return receipt

Chain of Custody (1 of 2)

- Begins at evidence collection point
- Ends at courtroom
- Accurate historical accounting of evidence must be kept
  - Details all parties who have come into possession of evidence

Chain of Custody (2 of 2)

- Strongest chain of custody has only one link:
  - The fire investigator

Examination and Testing of Physical Evidence

- Laboratory examination and testing
  - Laboratories provide wide variety of tests
- Sufficiency of samples
  - Tests require minimum quantity
- Comparative examination and testing
  - Appliances, lamps, outlets, etc.
  - Exemplar may be present within fire scene

Disposition of Physical Evidence

- Length of storage depends on various factors
  - Criminal cases may have no statute of limitations.
  - Civil cases may also use evidence years later.
- Maintain evidence until disposal is authorized in writing from all concerned in investigation
  - After that, return evidence to owner
  - Document its disposal.
Summary (1 of 5)
• The entire fire scene is considered physical evidence, including the fire patterns, sources of ignition, security and fire detection equipment, and items associated with the cause of the fire.

Summary (2 of 5)
• The fire investigator is responsible for locating, identifying, collecting, documenting, examining, storing, and arranging for testing of the physical evidence.

Summary (3 of 5)
• Common physical evidence includes traces of ignitible liquid in flooring, a tool mark at a point of forcible entry, a faulted electrical circuit, fingerprints, and blood.

Summary (4 of 5)
• Opportunities to contaminate evidence occur during firefighting, overhaul and salvage, and evidence handling, storage, and transportation.
• The collection of physical evidence is governed by its type, form, size, and condition.

Summary (5 of 5)
• Physical evidence is photographed where it was found and placed into a scene drawing.
• Forensic and legal requirements mandate that evidence be positively identified and maintained in a chain of custody from the point where it is collected right to the courtroom.