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Law Enforcement Bulletin

The Investigation of Fatal Fires

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The Cover:

An 8-alarm fire in a New York City department store in which there were 12 fatalities resulted in an arson homicide fire investigation.
See article p. 1.

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Arson



Fire marshals perform a physical examination at the scene of an arson homicide in Manhattan.
 Photo: C. Benson

The Investigation of Fatal Fires

Views of the Fire Investigator

(Part I)

What is meant by the term "fatal fire"? Basically, it is any fire, of whatever size, whose direct action causes the death of one or more human beings. However, the connotation, which is the more commonly used meaning, describes any fire, of whatever size, where a dead human body is discovered. This article will provide a broad overview of the methods and means used by the Bureau of Fire Investigation, New York City Fire Department, to establish the basis for conducting a fatal fire investigation.

Fire

While matter can be neither created nor destroyed, it can be altered, and there are many ways in which this alteration can be made. The application of heat is but one of those ways, resulting in a process generically termed "fire." (A working definition of fire is "rapid oxidation, usually accompanied with the evolution of heat and light.") This is a very complex chemical phenomenon that changes the fuel involved in its physical shape and properties and in its chemical makeup.

By

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Fire Commissioner

Origin

The ability to interpret and make sense of the results of the above phenomenon makes a good fire investigator. It is necessary to reconstruct the fire scene by replacing physical items of debris into their proper locations, and then observe what changes to the structure and its contents were caused by the fire. It is the mental application of the scientific principles of matter and energy, which had to have occurred to produce those changes, that allows us to determine the point at which the fire originated.

Cause

Once the point of origin has been derived, any evidence uncovered is used to determine the cause. A listing of all the possible causes present at the point of origin will evolve and be used to eliminate all nonappropriate causes. For every action there is a reaction, and every cause has an effect. Fire investigators find the former by making a logical interpretation of the latter. This elimination comes about as the result of the knowledge gained through observation and investigation.

This whole deductive process is controlled by the rule which states that in order to have a fire, you must have a fuel source, a heat source, and an event which brings the two together. Through training and experience, a fire investigator understands, recognizes, correlates, and collates each of the foregoing at a fire scene. He decides through deduction, and sometimes inference, that a particular item or event is or is not important, and possibly, the cause of the fire.

There are only two causes for fires—accidental/providential and incendiary. Accidental/providential is inclusive of all heat-producing objects or events created by man or God, but whose use on this occasion did not

have as its intent the results it obtained—the fire. Incendiary includes only the man-made, heat-producing objects or contrived events which, on this occasion, were meant to produce the results obtained.

The fire investigator's ability to internalize the subtle differences between the two provides him with information which will enable him to discern a fact pattern and establish the logical and correct solution to the cause of the fire. Hence, a gallon of gasoline inside of a building, ignited by an open flame, could be either an accidental or incendiary cause of the resulting fire. It is not merely the nature of the fuel or the type of heat source combined that mandates the cause; it is the human motivation, or lack of it, which precipitates this event. If all causes except a human-connected one can be eliminated, and it is determined that the fire has intent as one of its components (human motivation), then the case becomes a criminal investigation for arson.

Therefore, fire investigation is a quest not only for a specific heat source of fuel but an exploration into the psychology of those individuals who are involved in the event, in order to uncover any intent, or lack thereof, before a determination can be made as to the cause of a specific fire.

Common Motives

The National Fire Academy lists the following basic motives for people to set fires:

- Frauds for direct gain (insurance) and indirect gain (eliminate competition);
- Pyromania;
- Crime concealment (murder);
- Vanity (security guards for employment or hero wants to save victim);

"A fatal fire investigation is really two separate investigations conducted simultaneously ... for the cause of the fire and the cause of the victim's death."

- Spite/vengeance (in work, love, or religion);
- Civil disorders, revolutions, and political activity; and
- Actions of juveniles, adolescents, or children (ranges from gang activities to curiosity).

These motives are not listed in the order of their importance or occurrence, especially in New York City. The frequency of the above-mentioned motives is difficult to ascertain, since the obvious motive for a fire may really mask the underlying and true reason for that fire.

Guidelines for Conducting Fatal Fire Investigations

A fatal fire investigation is really two separate investigations conducted simultaneously. An investigation is conducted for the cause of the fire and the cause of the victim's death. The two investigations cannot be separated from one another, because the cause of one depends on the cause of the other and will affect, and sometimes change, the focus of the entire investigation.

Main Concerns of the Fire Investigator

It is the victim's cause and manner of death which will, at times, dictate the decision to rule an otherwise obvious and apparent accidental fire as one which could only have resulted from incendiary conduct by the human element. Whether the victim was alive or dead at the time of the fire's inception often emerges as the pivotal factor for determining if the fire's cause is accidental or incendiary.

Three questions are raised concerning victims of fatal fires:

- 1) Was he/she alive or dead at the inception of the fire?

- 2) Did he/she ingest some substance that impaired judgment to the point that safe exit from the fire scene was not possible?
- 3) Is the victim, in fact, the person whom we believe he/she to be?

The way and means by which these questions are answered advances a person's continuing education in fatal fire investigation. However, they will remain primarily the responsibility of the medical examiner. When a medical examiner gives a cause of death, any intent by a guilty human agency will be inferred from all the facts which have been ascertained in the case.

Photographs and Sketches

The victim, or the body, should be observed at the scene where it is found. This has always been, and will probably remain, a problem because the bodies are usually moved by firefighters and this usually occurs before the investigators arrive.

If the investigator does arrive prior to the removal of the body, photographs should be taken to show:

- 1) The scene exactly as it is when the body is discovered;
- 2) The body as it is uncovered, and the debris that is removed from over it;
- 3) The body as it is taken out, and the surface on which it was lying; and
- 4) The underside of the body that was initially hidden from view.

As many photographs should be taken as possible since the scene, body, and evidence will be obliterated or changed in a very short period of time. Several photographs of each item from differ-

ent angles should be taken, since it is impossible to predict which apparently insignificant item might gain importance and become a critical piece of evidence as the case progresses. In addition to photographs, sketches should be made to depict the surroundings to show the location and position of the body and the location of the camera for each photograph.

Examining the Body

The victim, or the body, is best observed where it is found, but this is not always possible. Even so, the investigator should still examine the body, regardless of where it is located.

Fire fatalities produce two categories of victims—those whose bodies have been burned and those whose bodies are not burned but usually suffer some effect of their surroundings. The extent of destruction to the body limits the ability to arrive at logical conclusions without the assistance of other experts.

Location and Position of the Body

If the body was not removed from the scene by firefighters, it is important to the investigation to determine if the location and position of the body is normal or abnormal; in other words, does the victim belong there (occupant, employee, customer, etc.)? Also, the proper location for the time frame must be considered. For example, was the victim the occupant whose body was found in the kitchen at dinner-time?

Most victims are expected to be found face down because they generally will be attempting to flee the fire. This means they were walking, which is nothing more than a series of falls forward propelled and controlled by the legs.

“Evidence collection in a fatal fire investigation is subject to all the same proscriptions and criteria as evidence in any other fire investigation....”

The body of the victim will usually be found headed toward an exit. If this is not the case, two questions are raised: Was the victim attempting to extinguish the fire or effect a rescue? or could the victim have become disoriented as a result of the smoke, alcohol, or drugs (legal and illegal)?

Manner or Mode of Dress

If the body has been exposed to flames, it may not be possible to determine the manner or mode of dress of the victim. However, if the clothing is intact, the investigator should take note of the type of clothing in relation to the occasion, location, or time frame of the fire (pajamas, sleeping, bedroom, nighttime). Other characteristics to be considered are the size, fit, style, and expense in relation to the measurements and lifestyle of the victim. Or perhaps the victim was dressed abnormally, such as in costume for a ritualistic event or party or in the clothing of the opposite sex.

Signs of Violence

Markings on the body could have occurred prior to or after death and could have been self-inflicted or the result of actions of others or the prevailing circumstances. The investigator should examine the body for any puncture wounds from a bullet, sharp instrument, miscellaneous projectiles from an explosion or falling objects, or signs of blunt force trauma (depressions, fractures, lacerations, bruises).

Another point to consider is the appearance of the victim as a result of change in body chemistry. Lividity is the reddish purple coloration of the skin due to the settling of the body fluids to the lower portion of the body as the result of gravity. Under normal circumstances, it will commence 1 to 2 hours after death and is completed after 3 to 4 hours.

The stiffening of all the musculature of the body is rigor mortis. Under normal circumstances, it commences from 3 to 5 hours after death and starts in the jaw and progresses downward. After approximately 48 hours, it dissipates, and the body will again appear supple.

Cyanosis results in a bluish-grey ashen appearance caused by a lack of oxygen and may be the result of a heart attack or asphyxia. Other signs of changes in body chemistry the investigator should be aware of are cherry red skin caused by carbon monoxide, cyanide, or immersion in icy water or snow; blisters; and body temperature. When occurring up to 15 minutes after death, blisters will contain the same sera and create marginal reddening to the skin, in much the same manner as when the victim was alive. After death, other blisters containing a different type sera, or air, can appear. The body's temperature drops about 3 to 4 degrees per hour for the first 2 to 3 hours. After that, it drops 1 to 2 degrees per hour until equilibrium is reached with the ambient temperature.

In addition to changes in body chemistry, the outside physical appearance can present clues as to the cause of death. Soot on the skin indicates that the body was present during the fire, while soot around and in breathing passages indicates the victim was alive and breathing during the fire. If the victim is found in a pugilistic position, this can be the result of heat contracting the large muscles and may indicate the victim's presence during the fire.

Injury to the skull can be caused by heat turning the liquids in the head to steam and fracturing the skull internally or causing the skull to explode.

However, this condition can also be the result of a high-velocity projectile entering the skull or the exit wound for a large-caliber bullet. Petechial hemorrhages, the bursting of blood vessels in the eyeballs, can usually be the sign of manual strangulation.

The body of the victim should also be examined for any preexisting conditions prior to death. The investigator should note any scars, growths (warts, moles, and tumors), deformities or abnormalities, and use of prosthetic devices. If the victim is female, distension in the abdomen and swelling of the breasts are signs of pregnancy that an autopsy would positively confirm. An x-ray would show fractures to the skull, ribs, arms, legs, or digits.

If possible, prints should be taken of all parts of the body that reproduce prints which can be matched with those on file at any authorized agency of record. If tattoos are visible on the body, or if obscured for some reason, confirmation may be obtained at autopsy by analysis of the lymph gland in the armpit closest to the site. This examination is conducted to discover deposits of ink that may have accumulated there over the years. It may also be possible to determine the color and age of this ink.

All this information will assist the investigator of a fatal fire in determining the identity of the victim, the fact that the victim was dead or alive at the time of the fire, and the cause of death.

Interviewing Witnesses

The interview of witnesses in a fatal fire investigation has a dual focus—to determine the cause of the fire and the cause of the victim's death. Therefore, along with all the others normally interviewed in the course of investigating any fire, those

who can provide the greatest amount of information about the victim should also be questioned. These would include family (husbands, wives, children, parents, and siblings), relatives, friends, neighbors, and coworkers. With regard to friends, neighbors, and coworkers, the length of acquaintance should not affect who is, or is not, interviewed. Those who knew the victim for only a short period of time may provide information crucial to the investigation.

When conducting an interview, the investigator should attempt to gather facts regarding the victim's mental and physical health, if the victim used any type of medication, or if there was the possibility of suicide. Other areas to explore are the social and economic status of the victim. This would include marital status, employment/financial stability, and existence of life insurance (conditions, amount, beneficiary).

The investigator should also question witnesses, family, and acquaintances regarding the actions of the victim before, at the time of, and during the fire. It is important to determine if the victim was acting rationally in comparison to normal behavior patterns, or if the victim was under the influence of drugs or alcohol. Perhaps, the victim may have been doing something that may have caused the fire and/or death, such as using solvents near an open flame or smoking in bed.

Collecting Evidence

Evidence collection in a fatal fire investigation is subject to all the same proscriptions and criteria as evidence in any other fire investigation, except that a portion of the evidence will differ only in what it tends to prove—the identity of the victim and the instrumentalities of his/her death. Therefore,

the investigator should seek items that would prove the victim's identity, such as personal papers and letters, photographs, jewelry, clothing, prized personal possessions, and religious artifacts. At the same time, it is important to look for the instrumentalities of death, including firearms, knives, poisons, ligature material, and blunt instruments.

Whatever evidence is collected with regard to the cause of the fire, the victim's identity, or the instrumentalities of death should be sent, if necessary, to the laboratory for analysis. The type of analysis requested would depend on what is being analyzed, the relationship to the case, and the facts intended to be proved.

All facts collected in the investigation to this point are nothing more than words with an indistinct, if not meaningless, explanation of the efforts of the investigator and will remain so until put in the proper order and perspective. When this occurs, preliminary conclusions will be reached regarding the victim's identity, his/her condition at the time of the fire, the cause of death, and reasons for failure to escape.

At this point it is necessary to confer with the medical examiner and request specific examinations at autopsy. These two steps are critical to the final solution of this case. The medical examiner has the expertise to confirm, or refute, preliminary findings. Also he cannot reach any true or sensible conclusion to his portion of the investigation until he is apprised of all the facts surrounding the death and the expert interpretation of these facts. No one, however gifted, can operate in a vacuum and exclude the findings, or opinions, of other equally knowledgeable people in fields pertinent to this type of investigation.

Formulate the Cause of the Fire

To formulate the correct cause of the fire, a review of all information, including that supplied by the medical examiner, is vital. This constitutes the totality of circumstances. Only when those variables which, because of the physical laws of nature, do not fit are excluded will a final, and correct, cause of the fire be determined.

Final Report

After a conclusion to the cause of the fire has been reached, the investigation will either be continued or closed. Circumstances will dictate which path will be followed. Whichever option is chosen, a complete and concise report must be filed. This report will act as the basis for present and future actions in this matter.

Our capability and competence will be measured not only by our ability to uncover pertinent facts and correctly interpret them but also by our ability to articulate all the material necessary to present a logical and cogent argument for arriving at the final conclusion.

Conclusion

A fire investigator attempts to make sense out of chaos. However, by following the steps outlined in this article, the task of completing a fatal fire investigation successfully becomes an achievable goal.

FBI

(Continued next month)

A Partnership Against Crime

"The program requires a great deal of energy and commitment from all levels of the police organization, as well as the involved citizenry."

By

DARYL F. GATES

Chief of Police

Los Angeles Police Department

Los Angeles, CA

Policing in the late 1980's and into the 1990's will be greatly different from the policing of two decades ago. One of the major differences, and an area of critical concern to police executives and managers, will be resolving demands for increased service within the constraints of reduced fiscal and personnel resources. Such prospects require today's managers to examine closely strategic alternatives to meet the demands that will be placed on their organizations.

The basic mission of law enforcement is to prevent crime. In the wake of such major tax reduction measures as Proposition 13, enacted in California during 1978, the Los Angeles Police Department, like many governmental agencies, was forced to eliminate or reduce many important but so-called "nonessential" services. One critical area which suffered as a result of post-Proposition 13 budget cuts in Los Angeles was crime prevention.

Historically, the Los Angeles Police Department has been a pioneering agency in the area of crime prevention. Neighborhood Watch has long been a cornerstone program fostering a tremendous educational conduit to the public. Specialized programs such as Business Watch, Senior Citizen Protection, Traffic Safety, Home Security,

Community Self-Protection, and Crime Prevention Specialist Volunteer programs have all had meaningful impact on crime. More recently, the Los Angeles Police Department, in conjunction with the Los Angeles Unified School District, pioneered the Drug Abuse Resistance Education (DARE) Program. DARE uses specially trained, uniformed Los Angeles police officers to teach elementary school-aged children the skills necessary to avoid getting started on drugs. Although these programs have proven extremely effective in reducing crime, lack of sufficient funding through the normal budgetary process has prevented the Los Angeles Police Department from providing optimum levels of these vital services.

Realizing indefinite fiscal constraints, the chief of police and top-level police managers conceived a strategy to provide alternate funding for the department's crime prevention programs. The strategy was predicated on the long-standing principle of "people working with police." It centered on the importance of public involvement in working toward the common community goal of preventing crime. The strategy called for the development of a citizen/police organization. This organization, or council, would operate under the complete endorsement of and affiliation with the police department. However, the council would be independent from the department itself.