



Investigation of Arson

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Abstract

Fire is a controlled phenomenon in which appearances oxidation of organic substances which generates heat and light. Fire is a key element in the evolution of modern man because it has enabled it to survive in different conditions. The definition of arson does not differ much from this definition of fire because it says fire is an uncontrolled phenomenon of oxidation of organic substances that also generate heat and light. Fire causes material damage and threatens human lives. Each fire and arson is a chemical processes that consists of three basic elements: fuel, oxygen and heat. Because of the nature of their occurrences, each fire and arson become subjects of interests in criminalities, forensics psychology and psychiatry. They are the subject of consideration of this paper.

Keywords: Fire; Arson; Investigation; Criminal act

Introduction

Fire was recognized from the moment of human consciousness [1]. It was present at the creation of the Universe. It has been a part of us from the beginning. Reliance on fire for warmth, light, cooking and the engine of industry has faded from our daily lives of today, and therefore we have become insensitive to the behaviour of fire. Mankind has invested much in the technology to maintain fire, but relatively little to prevent it. Of course, dramatic disastrous fire have been chronicled over recorded history, and they have taught more fear than complete lessons. Probably the low frequency of individually having a bad fire experience has caused us to forget more than we have learned. Fire is in the background of life in the developed world of today compared to being in the forefront of primitive cultures. Fire rarely invades our lives now, so why should we care about it? As society advances, its values depend on what is produced and those sources of production. However, as the means to acquire products becomes easier, values

turn inward to the general societal welfare and our environment. Uncontrolled fire can devastate our assets and production sources, and this relates to the societal costs of fire prevention and loss restoration. The effects of fire on people and the environment become social issues that depend on the political ideology and economics that prevail in the state. Thus, attention to fire prevention and control depend on its perceived damage potential and our social values in the state.

Arson often presents complex and difficult circumstances to investigate [2]. Normally these incidents are committed at the convenience of a perpetrator who has thoroughly planned the criminal act and has left the crime scene long before any official investigation is launched. Furthermore, proving commission of the offense is more difficult because of the extensive destruction that frequently dominates the crime scene. The contribution of the criminalist is only one aspect of a comprehensive and difficult investigative process that must establish a motive, the *modus operandi*, and a suspect. The

criminalist's function is limited; usually he or she is expected only to detect and identify relevant chemical materials collected at the scene and to reconstruct and identify igniters. Although a chemist can identify trace amounts of gasoline or kerosene in debris, no scientific test can determine whether an arsonist has used a pile of rubbish or paper to start a fire. Furthermore, a fire can have many accidental causes, including faulty wiring, overheated electric motors, improperly cleaned and regulated heating systems, and cigarette smoking - which usually leave no chemical traces. Thus, the final determination of the cause of a fire must consider numerous factors and requires an extensive on-site investigation. The ultimate determination must be made by an investigator whose training and knowledge have been augmented by the practical experiences of fire investigation.

Fire

Over the last 500 years, science has progressed at an accelerating pace from the beginnings of mathematical generality to a full set of conservation principles needed to address most problems [1]. Yet fire, one of the earliest tools of mankind, needed the last 50 years to give it mathematical expression. Fire is indeed complex and that surely helped to retard its scientific development. But first, what is fire? How shall we define it?

A flame is a chemical reaction producing a temperature of the order of at least 1500 K and generally about 2500 K at most in air. Fire is generally a turbulent ensemble of flames (or flamelets). A flamelet or laminar flame can have a thickness of the order of 10^{-3} cm and an exothermic production rate of energy per unit volume of about 10^8 W/cm³. However, at the onset of ignition, the reaction might only possess about 10^{-2} W/cm³. This is hardly perceptible, and its abrupt transition to a full flame represents a jump in thermal conditions, giving rise to the name thermal explosion. A flame could begin with the reactants mixed (premixed) or reactants that might diffuse together (diffusion flame). Generally, a flame is thought of with the reactants in the gas phase. Variations in this viewpoint for a flame or fire process might occur and are defined in special terminology. Indeed, while flame applies to a gas phase reaction, fire, and its synonym combustion, refers to a broader class of reactions that constitute a significant energy density rate. For example, smoldering is a combustion reaction (that could occur under temperatures as low as 600 K) between oxygen in air and the surface of a solid fuel. The combustion wave propagation through dynamite might be termed by some as an explosion, yet it is governed by premixed flame theory. Indeed, fire or combustion might

more broadly represent an exothermic chemical reaction that results from a runaway rate caused by temperature or catalytic effects. Note that we have avoided the often-used definition of fire as 'a chemical reaction in air giving off heat and light'. However, a flame may not always be seen; e.g. an H₂ flame would be transparent to the eye and not easily seen. A flame could be made adiabatic, and therefore heat is not given off. This could occur within the uniform temperature soot-laden regions of a large fire. Moreover, oxygen in air might not be the only oxidizer in a reaction termed combustion or fire. In general, we might agree that a flame applies to gas phase combustion while fire applies to all aspects of uncontrolled combustion.

The science of fire required the development of the mathematical description of the processes that comprise combustion. As with problems in convective heat and mass transfer, fire problems did not require profound new scientific discoveries after the general conservation principles and constitutive relations were established. However, fire is among the most complex of transport processes, and did require strategic mathematical formulations to render solutions. It required a thorough knowledge of the underlying processes to isolate its dominant elements in order to describe and effectively interpret experiments and create general mathematical solutions.

Spread of Fire

An understanding of the basic principles of combustion or fire, causes and sources of ignition, fire growth and fire spread is necessary for understanding the principles of fire control and extinguishment [3]. Combustion usually involves an exothermic chemical reaction between a substance or fuel and oxygen. Unlike slow oxidation, a combustion reaction occurs so rapidly that heat is generated faster than it is dissipated, causing a marked increase of temperature, even up to a few hundreds of degrees. Very often, the temperature reaches so high that visible light or flame is generated.

As has been stated, the burning of most materials produces a flame. A flame front stemming from a local ignition source is established in a flammable medium. A form of chemical reaction is set-up in the layer of gas adjacent to this source with the result that heat and what are called chain carriers pass into the next layer of gas and continue the cycle of the operations there, rather like runners in a relay race. Chain carriers are believed to be atoms or part of molecules, known as free radicals and these are extremely reactive. Combustion, therefore, is a type of chain-reaction.

Fire Investigation

Whenever a fire occurs, an investigation almost always ensues [4]. Depending on the laws in place within the jurisdiction, parties responsible for the fire are prosecuted under penal law if the fire was set intentionally or even, in some instances, if the fire was set accidentally. All the forensic sciences have goals of determining if a crime has been committed, identifying its victim(s) and perpetrator(s), and identifying the *modus operandi* of the perpetrator(s). Fire scene investigation, also referred to origin and cause investigation, is a specialized discipline of forensic sciences; it is carried out mainly to answer the question of whether or not a crime has been committed and what the *modus operandi* of the perpetrator is. The identification of victim(s) and perpetrator(s) is usually performed using a traditional criminalist approach and does not concern the origin and cause investigation itself. Therefore, the goals of fire scene investigation are to answer the following two specific questions: "Where did the fire start?" and "Why did the fire start?"

It is useful to learn as early as possible whether there were any eyewitnesses to the fire [5]. Eyewitnesses are not always reliable, but their reported observations constitute data that must be evaluated. Particularly in cases where full room involvement has occurred, eyewitness accounts may tell the investigator more than the fire artifacts can. This can save an immense amount of work. Witnesses might have photographed or videotaped the fire in progress. If a building has a security system, there may be records of alarm activations or, possibly, videotapes from security cameras (though the cameras always seem to aim just to the left or right of where we would like). Generally, alarm monitoring companies will respond only to inquiries coming directly from a customer; and even then, many are nervous because they understand that they may be held liable if their system failed to respond to a fire. Fire investigation can occur in two different stages [6]. The first involves examination of the fire scene to determine the cause, origin and development/spread of fire. The second involves laboratory analysis of samples recovered from a fire scene normally when arson is suspected. While both of these may be linked together, they may be activities carried out by different personnel with different backgrounds and experience.

In order to successfully carry out fire scene investigations, the investigator should have an understanding of a variety of concepts. These include:

- i. the fundamental practices and methodology involved in fire scene and crime scene investigation;
- ii. the necessary conditions for a fire to be initiated and maintained.
- iii. knowledge of the dynamics of a fire and factors influencing fire development and spread.
- iv. knowledge of different types of fuel packages, their auto-ignition temperatures, behaviour in fires and the level of heat release which they may produce.
- v. different types of burn and smoke patterns and their interpretation.
- vi. sampling protocols, packaging, etc.

Only with a sound knowledge of these and other factors an investigator carry out his or her scene investigation efficiently and correctly. Laboratory based analysis requires the appropriate skill and knowledge of relevant scientific instrumentation, proper laboratory practice in dealing with crime scene evidence and an understanding of the nature of materials including flammable liquids, their paralysis and combustion products as well as an ability to interpret the results of their analysis.

Motivations for arson are often varied and complex and can include:

- i. Criminal intent such as covering up other crimes (theft, murder).
- ii. Financial gain (insurance claims).
- iii. Civil disorder (youth disorder, vandalism).
- iv. Malicious intent (grudge/reprisal against a particular race, religion, societal group).
- v. As part of a series of crimes of a known arsonist.
- vi. Acts of terrorism with motivations such as urban unrest, racial or religious hatred or for political reasons.

Property Crime

Crimes against property take a wide variety of forms [7]. Familiar instances include burglary, robbery, motor vehicle theft, and criminal damage (e.g. arson and vandalism). In addition to such relatively 'low level' offences, property crimes are also committed by powerful organisations and institutions such as corporations and states, and can include crime such as the illegal appropriation of land and the extraction of valuable natural resources. Property crime may be committed by a variety of means, variously making use of force, stealth and fraud. Some types of property crime will also entail other kinds of criminal offence, as in the case of robbery that uses violence against the person in order to deprive people of their property.

According to official statistics property offences account for a majority of reported crime, comprising around 80 per cent of crimes. The increasing number of property crimes has been held responsible for the strong upward trend in recorded crime that occurred across many Western societies in the post-World War II decades. One widely cited explanation for this rise has been the massive increase in property ownership, especially the proliferation of portable, high value goods such as home electronics and consumer durables, along with the massive increase in car ownership. These developments increase the availability of potential targets suitable for criminal predation. Criminal damage results from any person who without lawful excuse destroys or damages any property belonging to another, intending to destroy or damage any such property or being reckless as to whether any such property would be destroyed or damaged [8].

Arson

Arson is traditionally defined as “any wilful or malicious burning or attempting to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property, etc.” The UCR categorizes the types of structures that are damaged by arson as structural, mobile, and other [9]. Each year, arson accounts for hundreds of millions of dollars in property damage. The crime of arson is a more intense form of property crime because it can cause so much damage. Arson is the wilful, malicious burning of a home, public building, vehicle, or commercial building [10]. Although arson data can be sketchy, the FBI reports that about 65,000 arsons are now recorded annually, with an average cost of about \$17,000 each. Arson attacks are not unique to the United States. There are several motives for arson [11]. Adult arsonists may be motivated by severe emotional turmoil. Some psychologists view fire starting as a function of a disturbed personality. Arson, therefore, should be viewed as a mental health problem and not a criminal act. It is alleged that arsonists often experience sexual pleasure from starting fire and then observing their destructive effects. Although some arsonists may be aroused sexually by their activities, there is little evidence that most arsonists are psychosexually motivated. It is equally likely that fire are started by angry people looking for revenge against property owners or by teenagers out to vandalize property.

These findings support the claim that arson should be viewed as a mental health problem, not a criminal act, and that it should be treated with counselling and other therapeutic measures rather than severe punishments. In the western United States, but also in other parts of the

world with forested areas, especially in Europe, wildfires are a significant problem every summer, requiring thousands of fire fighters and millions of dollars to put them out. Mounting evidence suggests that significant numbers of these fires are started intentionally by people - some of whom seek work fighting the very fires they start [12] (Of course, lightning strikes and careless humans start many wildfires, too.)

Police face daunting challenges in proving the crime of arson. After all, the fire destroys most of the evidence. Nonetheless, arson investigators, many of the fire department workers, are skilled at identifying the causes of fires. Arson investigators talk to the firemen who first arrived at the scene to find out whether they detected any clues about where the fire started, how it progressed, or what color the smoke was. Investigators can often detect the location where a fire originated because of evidence of the use of accelerants, such as gasoline-soaked rags or lighter fluid. Similarly, investigators look for signs of forced entry by the arsonist or even tampering with fire suppression systems. And, of course, the presence of a motive, such as burning a business that's failing, can be an important clue that eventually leads police to the arsonist who started the fire.

While some police departments have trained arson investigators, this type of scene is usually the domain of the Fire Department [13]. In all suspicious fire and all fire that involve death(s), an arson investigation should be conducted to determine the cause and origin of the fire. Arson investigation is a highly specialized field requiring training that is not available to the average investigator or crime scene technician. The arson investigator will be trained in the collection and handling of evidence, and he/she should be in charge of the scene until the completion of his or her investigation. If the arson investigator determines that the cause of the fire was accidental, the police department's only concern should be the safety of the scene, the identification of the victims, and notification of next of kin.

Pyromania

From the perspective of clinical diagnoses, fire setting takes the form of pyromania, an impulse disorder “which is characterized by acts of, or attempts at setting fire to property or other objects, without apparent motive, and by a persistent preoccupation with subjects related to fire and burning [14]. There may also be an abnormal interest in fire engines and other fire fighting equipment, in other associations of fires, and in calling out the fire service”. Therefore the essential features are:

- i. Repeated fire setting without any obvious motive such as monetary gain, revenge, or political extremism.
- ii. An intense interest in watching fires burn.
- iii. Reported feelings of increasing tensions before the act, and intense excitement immediately after it has been carried out.

The differential diagnosis for pathological fire setting enables distinctions to be made across a range of broader disorders contained within the ICD-10 (Habit and Impulse Disorders; World Health Organization, 2010.) and where fire setting occurs within the context of

- i. Observation for suspected mental disorder;
- ii. Conduct disorder;
- iii. Sociopathic personality disorder;
- iv. Schizophrenia; and
- v. Organic psychiatric disorders. It is also beneficial to acknowledge the occurrence of inadvertent fire setting in relation to dementia, acute drunkenness, chronic alcoholism, and other drug intoxication. However, within the context of forensic settings, the interpretation of motive for fire setting could become blurred when drug or alcohol intoxication is an aspect of a broader set of circumstances.

Criminal Investigation

Arson investigators begin their task by studying the complex chemical process that is fire [15]. Each fire consists of three basic elements: fuel, oxygen, and heat. The physical state and shape of the fuel, available oxygen, and the transmission of heat all play critical roles in development of a specific fire. Investigators must also understand the basics of building construction, including materials used and the nature of any fire-protection systems in place, which determine the course of a fire's development and progress.

Crime scene investigation can be straightforward, or it can present challenges that require a multidisciplinary approach to resolve [16]. First responders can be misled, and the scene that appears to be an accidental fire may have, in fact, been staged to cover up additional offenses. Remember that physical evidence does not lie, but hasty conclusions can cause the investigator to miss valuable clues. No item is too insignificant to record. If it catches your attention, document it. Particularly in the instance of arson investigations, additional crimes may be uncovered, ranging from insurance fraud to homicide. The CSI must be diligent and observant and follow standard protocols for every type of scene response. The criminal procedure is a particular information and communication system [17]. At its core, information is a feature of things, states,

relationships expressed in the form of a certain sign, attribute, data of importance and purpose, which serves for decision-making and management.

The path to criminal information consists of:

- a. Fact - object of observation,
- b. Data - what describes the fact,
- c. Data processing - data merge according to syntax rules,
- d. News - sentences in space and time delivered by the sender to the recipient,
- e. Information - news content which has value who triggers the action for the recipient.

The quality of criminological research results is conditioned by a large number of diverse factors. It largely depends on input sizes. Input sizes are the data that forms the basis for initiating a research (the first information of the probable occurrence of a criminal act) and consists of knowledge of the criminal act and the perpetrator (integrity, strength and content of suspicion). The complex structure of the criminal justice system requires the participants to know their legal frameworks. Since the system of criminal proceedings is a means of applying the provisions of material criminal law, it is necessary to know the legal framework. The investigator must also possess something more: operational knowledge of the phenomenon of the crime, the means of collecting cognitions, the management and conducting of the research.

When it comes to possible causes of fire, it is, in fact, the cause of the fire, and the causes may be different [18]. The discovery of the cause of fire is the ultimate goal of criminal investigation because it determines the type of event that caused the fire, that is, the normative side of the event characterized by fire (according to statistical indicators the most common causes: negligent-negligence, technical causes: malfunction of electrical installations and devices, child game, construction defects, self-ignition and the other, while about 10% of the fire is deliberately induced). The cause of the fire is the criterion that distinguishes the fire as an incrimination event whose *modus operandi* contains a fire as its determination.

One of the first concerns of a fire investigator is the fire's origin [19]. Fires can be classified by their causes as accidental fires, natural fires (caused without human intervention), arson (fires of incendiary origin), and fires of unknown origin.

Many fires are started accidentally, when children play with matches or people are careless with cigarettes, cigars, or pipe ashes. Some fires are of natural origin and occur without human intervention because of spontaneous combustion, defective heating units, faulty electrical appliances or wiring, and the like. Arson is a

person's deliberate, wilful, and malicious burning of a building or personal property. Arson is the easiest of the major crimes to commit, the most difficult to detect, and the hardest to prove in court. Arson kills an estimated 500 to 1,000 people every year in the United States, in addition to injuring thousands of others. Arson leads to more than a billion dollars in property damages every year, plus the loss of millions of dollars in jobs and in property taxes to local governments. Arson also raises fire insurance rates, passing the costs of arson on to the general public. Arson is an inherently difficult crime to detect and prosecute, in part because the motivations for and methods of committing arson vary widely [20]. Some arsonists may be troubled juveniles who start fires with matches or cigarettes; others are professional arsonists, who frequently use timing devices and accelerants. Arson investigation also falls between police responsibility and fire department responsibility, an area that is too often not effectively covered. Both the police and the fire services can legitimately claim authority in arson cases, but each also may rationalize that the responsibility belongs to the other. Unfortunately, in most jurisdictions, neither is prepared to devote the resources needed to achieve identification, arrest, and conviction rates commensurate with other crimes. Arson investigators need more cooperation and better training. Administrative officials need to help, but in order to help they need to give the problem a greater share of their attention. Probably the most urgent step in controlling arson rates is for top fire and police officials and local, state, and national governments to recognize the magnitude of the problem and then provide the necessary resources to combat it.

Legal Treatment of Arson in United States

Like burglary, arson was a felony at common law designed to protect the security of the dwelling place [21].

The crime consisted of:

- a. The willful and malicious burning
- b. Of a dwelling
- c. Of another.

There was no requirement that the dwelling be destroyed or even that it be damaged to a significant degree. In fact, a mere charring was sufficient, but scorching or smoke damage did not constitute arson at common law. The common law defined the term "dwelling" the same as in burglary. Consequently, the burning of buildings within the cartilage constituted arson. The common law regarded arson as a general-intent crime, with the required malice being presumed from an intentional burning of someone's dwelling. However, setting fire to one's own home was not arson at common law. Yet some

early English cases indicate that under circumstances where burning one's own house posed a danger to others, "house burning" was a misdemeanour offense.

Modern statutes have extended the offense of arson to include the intentional burning of buildings, structures, and vehicles of all types. Frequently, this even includes a person's own property. Several states have enacted statutes that provide that the use of explosives to damage a structure constitutes arson. As in burglary, the modern offense of arson is designed to protect many forms of property. Therefore, arson can no longer be considered strictly a habitation offense. By categorizing arson, legislatures can make appropriate distinctions and provide penalties accordingly. Michigan law embraces four categories of arson. Mich. Comp. Laws Ann. § 750.72 provide: Any person who wilfully or maliciously burns any dwelling house, either occupied or unoccupied, or the contents thereof, whether owned by himself or another, or any building within the cartilage of such dwelling house, or the contents thereof, shall be guilty of a felony. Typically, there are two degrees of arson [22]. Most serious, first-degree arson is burning homes or other occupied structures (such as schools, offices, and churches) where there's danger to human life. Second-degree arson includes burning unoccupied structures, vehicles, and boats.

The MPC (Model Penal Code) divides arson into two degrees, based on defendants' blameworthiness. The most blameworthy are defendants who intend to destroy buildings, not merely set fire to burn them; these are first-degree arsonists. Second-degree arsonists set buildings on fire for other purposes. For example, if I burn a wall with an acetylene torch because I want to steal valuable fixtures attached to the wall, I'm guilty of second-degree arson for "recklessly" exposing the building to destruction even though I meant only to steal fixtures. Statutes don't grade arson according to motive, but it probably ought to play some part, if not in formal degrees, then in sentencing. Why? Because arsonists act for a variety of fire motives. Some are so consumed by rage they burn down their enemies' homes. Then there are the pyromaniacs, whose psychotic compulsion drives them to set buildings on fire for thrills. And there are the rational, but equally deadly, arsonists who burn down their own buildings or destroy their own property to collect insurance. Finally, and most deadly and difficult to catch, the professional torch commits arson for hire.

Legal Treatment of Arson in United Kingdom

If the destruction or damage is caused by fire, the offence is arson: s 1(3). The fire need not be a major one: it

suffices that the slightest damage is caused by the fire [23]. The maximum penalty is life imprisonment. Section 1(3) reads: 'An offence committed under this section by destroying or damaging property by fire shall be charged as arson.' Section 1(3) applies to both s 1(1) and s 1(2). The charge is arson contrary to s 1(1) (or s 1(2)) and s 1(3) of the Criminal Damage Act 1971. The restrictions in s 1(1) and s 1(2) also apply where the cause of the damage is fire, e.g. if the property belongs to the accused, there is no charge possible under s 1(1) and s 1(3). It should be noted that the maximum sentence in s 1(3) applies even though the sole difference between the 'simple' offence and s 1(3) is that the damage was caused by fire. Presumably the accused must intend to cause, or be reckless as to causing, damage by fire. If, for instance, he intends a bomb to explode, but the damage is in fact occasioned by fire, he is not guilty under s 1(3). This point, however, is not settled. The Law Commission in its Report No. 29, *Offences of Damage to Property, 1970*, recommended the abolition of the separate offence of arson, but Parliament disagreed. The charge of arson was retained because of the public's desire to stigmatise the defendant who set light to property. Another reason was given by the Law Commission, the Report of which led to the 1971 statute. Fires were often started by the mentally ill. Finding them guilty of an offence for which the maximum sentence was life imprisonment could result in safeguarding the public. The contrary argument on this point is easily put: pyromaniacs by definition cannot stop themselves causing fires and prison is unlikely to cure them.

Evidence

Under constitutional system of law, the values of fairness and liberty place the burden on the prosecution in a criminal trial to present sufficient evidence to support a reasonable finding of guilt [24]. A defendant does not have to present evidence to counteract the prosecution's evidence but may do so. In the United States, where citizens have inalienable rights to life, liberty, and property, the prosecution alone has the burden of proof, and the evidence presented must be credible and reliable. A prosecution cannot be based on mere possibilities, suspicion, or speculation; we require substantive evidence. Evidence means testimony, writings, material objects, or other things offered to prove the existence or nonexistence of a fact. Its purpose is to establish the truth of a proposition, and for that reason it must comply with strict rules of admissibility in order to bar the use of improper, misleading, or prejudicial material. Common law and statutory rules embody protections to ensure the reliability of evidence so erroneous verdicts are not reached.

Proving a case by presenting evidence in a courtroom is inherently difficult because a case is only a reconstruction of a past event. Time is irreversible and any reconstruction of past events, at best, can be only an approximation. Defendants who counter the arguments of a prosecution with alternative theories and alternative reconstructions also face a difficult task, but in most cases it is better than remaining passive. The clash of adversaries challenging the other side's evidence refines the process and allows judges and juries to see a more complete picture. Ultimately, the law of evidence is a discipline to ascertain truth and justice, and to be sufficient the evidence presented must convince a reasonable judge or jury of the truth of the proposition.

Evidence may be defined as anything that is legally seized and submitted to a court of law for consideration in determining the truth in a matter [25]. Investigators have traditionally viewed evidence as anything that a suspect leaves at or takes from a crime scene or anything that may be otherwise connected to the crime under investigation. Physical evidence is defined as any finite or tangible material, whether in trace or gross quantity, that may assist with proving elements of a crime. The proper recognition, documentation, collection, analysis, and interpretation of physical evidence can provide valuable information to the investigation.

- a. Facts and reconstruction of events to provide that a crime has occurred
- b. The method utilized to commit the crime
- c. The linking of a suspect with a victim and/or the crime scene
- d. Supporting or refuting a suspect's version of events
- e. Identification of a suspect
- f. Exoneration of the innocent

Fire Alarm Systems

All fire alarm and fire protection systems, whether required or not, if installed, must be tested and maintained according to schedules provided in appropriate codes [26]. When new systems are installed, it should not be assumed that they are installed properly for any reason. All fire alarm, fire protection, and life safety systems need to be tested to make sure they work as intended and required by code. Once systems have been accepted and occupancy permits are issued, the testing and maintenance process needs to continue according to schedules and time frames dictated by the codes to insure that systems will continue to function as intended for years to come. Owners of property are responsible for the maintenance and testing of all fire alarm, fire protection, and life safety systems. However, fire prevention personnel must provide the necessary

periodic oversight to make sure that the testing and maintenance takes place.

Conclusion

Fire and arson always make great damage to property. In order to minimize the damage, one of the solutions offers modern fire alarm systems. They are, as a rule, set only in homes where people live, and rarely on other property such as agricultural areas. Modern fire alarm systems can also be set up in forest areas which are particularly vulnerable by the summer. Surveillance can be done from the police or from the fire department. Contemporary computer technology is at a very high level of development and can enable such a form of surveillance. Only additional investment in the equipment is required. These are investments that return multiple times. When it comes of arson, criminality's and forensics have a task, on the one hand, to detect the cause of arson and, on the other hand, to detect the perpetrator. Psychological profile of perpetrator is a task to be performed by psychology, and psychiatry has the task of determining whether the perpetrator is suffering from some mental illness or suffering from some mental disorder. These are the most important facts that will be adduced in the indictment and are presented in the criminal procedure on the court. The penalty which will be pronounced on the perpetrator will be in accordance with the law.

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