CRIME SCENE MANAGEMENT IN CRIMINAL INVESTIGATION: A CRITICAL STUDY

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Introduction:

Identifying, recording, and gathering physical and biological evidence at the crime scene is the aim of crime scene investigation. Because the case being investigated must be presented in court, this process must be carried out carefully and thoughtfully. Piecing together the facts to create a picture of what happened at the crime site will be essential to solving the crime. Securing the crime scene, taking pictures, doing a thorough search, documenting the scene methodically, and appropriately gathering, packing, preserving, and transporting all of the evidence found at a particular crime scene are all part of crime scene investigation. Most of the time, whether or not physical evidence will be used to solve or prosecute crimes depends heavily on the investigating officer who guards and investigates a crime scene[1].

The location where criminal activity is investigated is known as a crime scene. Investigative teams, comprising crime scene investigators (CSIs) and sometimes forensic scientists, will record and collect visual and tangible evidence at crime scenes. One of their most significant responsibilities is to preserve evidence and forward it along the appropriate chain of custody. Crime scenes are characterized by a great deal of documentation and any evidence that may be there.

Fingerprints, hair, blood, footsteps, the location of furniture in the room, and even the victim's wounds in the event of a violent crime can all be considered pieces of evidence. Crime scene investigators may look into a secondary crime scene, which is connected but not the actual crime scene, or the primary crime scene, where the crime really occurred. For instance, someone abducts a person from their home. The residence is the location of the crime, but in the case of the kidnapping, the hotel is a secondary crime scene when the victim is discovered alive and restrained at a hotel many miles away. There are three different kinds of crime scenes:

[1] https://dfs.nic.in – Standard Operating Procedures For Crime Scene Investigation

the indoor, outdoor, and conveyance.

If not properly preserved, an outdoor crime scene is vulnerable to the weather. Even while an indoor crime scene is far less likely to be contaminated, it still needs to be properly documented and preserved. The actions one takes to commit a conveyance offense are part of the crime. For instance, investigators should search for evidence from indoor or outdoor crime scenes as well as modes of transportation. Is there evidence of footsteps leaving the murder scene? Is there a missing car that the offender might have used?[2]

Scope of the Study:

This study examines the procedural and practical dimensions of crime scene management in criminal investigation, with specific focus on the protection of crime scenes, search methodologies, documentation practices, preservation protocols, chain of custody, and the tools used during crime scene processing.

The research is confined to:

* Measures taken for securing and isolating crime scenes

* Scientific and systematic search methods employed by investigating officers

* Documentation techniques including note-making, photography, videography, and sketch preparation

* Maintenance of chain of custody records

* Preservation procedures to prevent contamination and degradation

* Modern tools and technological aids used at crime scenes

The study does not examine the classification of evidence (biological, physical, trace, etc.) nor the evidentiary appreciation by courts under the Indian Evidence Act. Instead, it critically evaluates whether procedural safeguards at the crime scene stage ensure integrity, reliability, and admissibility within the framework of the Code of Criminal Procedure.

[2] https://study.com

Geographically, the study primarily focuses on Indian investigative practices, while selectively referring to international standards such as those followed by the Federal Bureau of Investigation for comparative insight.

Review of Literature:

The present research inevitably utilizes various statutes, case laws, international instruments, books, newspapers, articles, journals etc. The following is a brief survey of important literature which was utilized by the researcher:

1. The Crime Scene: How Forensic Science works by W. Mark Dale and Wendy S. Becker
2. Criminal Investigation by James N. Gilbert
3. Crime Scene Investigation by Roy Fenoff, Jacqueline T. Fish, Larry S. Miller, Edward W. Wallace and Michael C. Braswell
4. Criminal Investigation by Bruce L. Berg
5. Forensic Science and Law by Cyril H. Wecht, John T. Rago, Benjamin E. Wecht
6. Forensic Science: the basics by Jay A. Siegel, Kathy Mirakovits

Objectives of the Study:

The primary objective of this study is to critically examine the procedural framework and practical implementation of crime scene management in criminal investigations, with particular emphasis on protection of the crime scene, search methodologies, documentation practices, preservation protocols, and maintenance of chain of custody.

The specific objectives of the study are:

1. To analyse the legal and procedural framework governing crime scene protection and management under the Code of Criminal Procedure and related investigative guidelines.

2. To examine the importance of securing and protecting the crime scene in preventing contamination, tampering, and loss of material traces.

3. To study and evaluate different search methods employed during crime scene investigation and assess their effectiveness in ensuring systematic and scientific processing.

4. To critically analyse documentation practices including Note-making by investigating officers, Crime scene photography, Videography, Preparation of rough and final sketches.

5. To evaluate the role and significance of chain of custody in maintaining evidentiary integrity from the crime scene to forensic examination.

6. To assess preservation techniques adopted to prevent deterioration, contamination, or alteration of materials collected from the crime scene.

7. To examine the adequacy and effectiveness of tools and technological aids used in crime scene processing.

8. To identify procedural lapses and practical challenges affecting crime scene management in India.

9. To suggest reforms and improvements aimed at strengthening scientific crime scene management practices and ensuring greater reliability in criminal investigations.

Hypothesis:

1. Whether Improper protection, inadequate documentation, and lapses in preservation and chain of custody at crime scenes significantly undermine the reliability of criminal investigation?

2. Whether Lack of specialised training and technological infrastructure contributes to procedural lapses in crime scene management?

3. Whether Standard operating procedures for search and documentation are inconsistently implemented across jurisdictions?

4. Whether Strengthening documentation protocols and digital chain-of-custody systems would enhance investigative transparency and judicial confidence?

Research Methodology:

This study adopts a doctrinal and analytical research methodology. The research is qualitative and critical in nature, focusing on statutory provisions, judicial interpretations, procedural manuals, and forensic guidelines. Primary Sources such as Code of Criminal Procedure 1908, Indian Evidence Act 1872, Indian Penal Code 1860 and Judicial decisions. Secondary Sources such as Textbooks on criminal investigation and forensic science, Research articles and journals and Comparative international standards.

Limitations of the Study:

* The study does not include empirical fieldwork or interviews.

* It does not examine classification of evidence types.

* The research is limited to procedural and managerial aspects of crime scene handling.

Historical Background and Evolution of forensic science in Criminal Investigation:

1. Ancient and Early India (Pre-Colonial Period):

• **Traditional Crime-Solving Techniques:** Witness accounts, tangible evidence, and circumstantial clues were the foundations of early Indian legal systems.

• **Arthashastra (3rd century BCE):** Although it did not explain forensic science as we know it today, Kautilya's Arthashastra discusses the necessity of evidence gathering and investigation methods.

• **Limited Scientific Methods:** At this period, investigations were frequently dependent on local judicial procedures and customs, and the use of tangible evidence was simple.

2. British Colonial Influence (19th Century):

• **Introduction of Modern Investigative Methods:** The use of scientific procedures in investigations and more methodical approaches to criminal justice were brought about by British colonial administration.

• **Fingerprinting:** One of the first nations to employ fingerprinting in criminal

investigations was India in 1897. The technique was first applied in a criminal case in India after being first introduced by the British.

- **Ballistics and Toxicology:** In the late 19th century, ballistics and forensic toxicology were introduced as crucial techniques for crime solving.

- **Establishment of Criminal Investigation Departments:** In the early 1800s, the British established the first Criminal Investigation Department (CID) in India, which laid the groundwork for structured criminal investigations.

3. Post-Independence Development (1947-1950s):

- **Legal Framework:** The foundation for incorporating forensic science into legal procedures was established by India's adoption of the Indian Penal Code (IPC) in 1860, the Indian Evidence Act in 1872, and the Criminal Procedure Code (CrPC) in 1973 following its independence.

- **Incorporation of Expert Testimony:** Forensic science professionals were able to testify on a variety of scientific studies according to Section 45 of the Indian Evidence Act, 1872, which permitted expert opinions to be entered as evidence in court.

- **Establishment of Forensic Laboratories:** The Central Forensic Science Laboratory (CFSL) was founded in 1951 to provide scientific analysis to law enforcement organizations in India.

4. Expansion of Forensic Science (1960s-1970s):

- **Regional Laboratories:** Regional forensic labs were established all over India during this time to assist regional law enforcement organizations.

- **Growth of Forensic Disciplines:** Toxicology, ballistics, and serology (blood analysis) were among the forensic disciplines that started to be incorporated into criminal investigations, giving law enforcement additional instruments for scientific evidence examination.

- **Initial Use of DNA Analysis:** The first use of DNA analysis was in blood testing and biochemical analysis, which laid the groundwork for further developments even though DNA profiling had not yet been developed.

5. Technological Advancements (1980s-1990s)

- **Introduction of DNA Profiling:** The invention of DNA profiling transformed forensic science in the early 1980s. In the 1990s, India embraced this technique, which enables forensic experts to use genetic material to connect suspects to crime scenes.

- **High-Profile Criminal Cases:** The use of DNA evidence in high-profile cases, like the 1991 Rajiv Gandhi assassination probe, showed how forensic technology can solve complicated crimes.

- **Growth in the Use of Forensic Experts:** As forensic science acquired legitimacy, forensic experts were used more frequently in courts.

6. Modernization and Institutionalization (2000s-Present):

- **Cyber Forensics and Digital Evidence:** Digital forensics became a part of forensic science as cybercrimes increased. As technology and the internet grew, new problems like hacking, cyber fraud, and data breaches emerged, necessitating the use of specialized forensic techniques.

- **Advancement in Forensic Technology:** The development of modern forensic techniques, including as digital forensics, forensic anthropology, and forensic odontology, has made it possible for India to keep up with new types of crime in the twenty-first century.

- **National Forensic Science Policy (2019):** The National Forensic Sciences University was founded in Gandhinagar, Gujarat, in 2008 to increase professional training and understanding in the field of forensic science by offering specialized education and research.

- **National Forensic Science Policy (2019):** In order to standardize forensic procedures, enhance laboratory facilities, and encourage the application of scientific techniques in criminal investigations and prosecutions, the Indian government introduced the National Forensic Science Policy in 2019.

- **Emerging Forensic Fields:** As technology continues to advance, emerging disciplines like forensic pathology, forensic accounting, and forensic linguistics have broadened the

application of forensic science in legal investigations.[3]

Classification of crime scenes:

Based on evidence found on the crime scene:

1. Primary Crime Scene

The principal crime scene is the location where the actual crime was committed or where more useful evidence was found. For instance, a scene of a murder, theft, assault, etc.

2. Secondary Crime Scene

A secondary crime scene is one that is somewhat connected to the scene of the crime but is not the primary location of the crime. It is crucial because it could establish a solid connection between the victim and the culprit.

For example: When a murder is committed at one location and the body is disposed of somewhere else. In this instance, more information about the suspect's clothing, fibre, hair, weapon, etc., may be found at the secondary crime scene, where the body is disposed. This will assist in locating the main crime site.

Other types:

1. Outdoor crime scene:

An outdoor crime scene is a place where a crime is committed in a wide, open space, such as a park, playground, road, or field. Evidence from an outside crime scene is more prone to being lost or contaminated by the elements, such as direct sunlight, air, or severe weather. Therefore, a forensic expert or the first responding office must handle the evidence and documentation of outdoor crimes professionally. Depending on the size of the crime scene, more investigative teams are needed.

Climate conditions are more likely to harm the evidence. Outdoor crime situations tend to have more eyewitnesses, which helps speed up the case's resolve. When searching for evidence

[3] https://www.lawjournal.info/article/pdf

at an outdoor crime scene, the grid or strip search strategy yields better results. Evidence that cannot be safeguarded in these circumstances ought to be gathered quickly without losing its reliability. Outdoor crime situations at night were particularly troublesome. Outdoor crime scenes should, whenever possible, be locked up and guarded until daybreak in order to speed up investigation.

2. Indoor Crime Scene:

An indoor crime scene is a crime that is committed in a tiny, enclosed space, such as a room, hallway, kitchen, etc. Because it took place in an enclosed space, the scene is less prone to evidence loss or contamination. Therefore, quick sealing of the location's entry/exit gates, such as doors and windows, facilitates the easy collection of evidence and allows for a speedy case resolution. Since the area of an indoor crime scene is typically tiny, it calls for a small team of IOs and forensic specialists. Climate-related evidence damage is less likely to occur. Because interior crime scenes are typically confined and secured, there are typically fewer or no eyewitnesses present. When searching for evidence in an indoor crime scene, the spiral, circular, and zone search approaches yield better results.

3. Mobile/Conveyance Crime Scene:

Conveyance means transportation. Crimes involving vehicles, trains, buses, lifts, and airplanes are examples of conveyance-related offenses. These incidents may yield physical evidence that goes far beyond the conveyance. Rashly departing suspects may leave behind more evidence. Once the necessary paperwork is finished, a conveyance such as a car be transported to the lab[4].

Based on the size of the crime scene:

1. Macroscopic

2. Microscopic

A single macroscopic crime scene, such a house, may really be made up of numerous smaller or microscopic crime scenes according to this classification. For instance, the body of a gunshot

[4] https://www.scribd.com/Types-of-Crime-Scene

victim left in a field symbolizes the following crime scenes: the body, the wounds on the body, and the surrounding ground. The particular kinds of tangible evidence discovered in the macroscopic crime scenes are the main focus of the scene's microscopic classification. The trace evidence on the body, the gunshot residue surrounding the wound, and the fire tread marks in the ground adjacent to the body are examples of microscopic crime scenes.

Initial Response to Crime Scene:

The Initial responding officer upon arrival shall access the scene. He should Note/log dispatch information (eg: address/location, time, date, parties involved). Be aware of any persons or vehicles leaving the crime scene.

The duties of the first responder include the following:

A. Assist the victim.

B. Search for and arrest the suspect if that person is still present in the crime scene.

C. Protect and secure the crime scene.

D. Establish a crime scene security log to record any person who enter or exit the crime scene and limit the access[5].



[5] https://www.slideshare.net/slideshow/crime-scene-management

Protection of Crime Scene:

Protecting the crime scene is the most crucial part of collecting and preserving evidence. To prevent contamination and preserve the reliability of the evidence, the crime scene must be heavily guarded until all of the evidence has been documented and gathered. The physical evidence's condition at the time of collecting and its placement may have an impact on the case's successful prosecution. It is important to properly inspect the entry and exit methods. The crime scene should be taken over by the first responder, who will also assess the scene's level of protection. To determine the true state of the crime scene and the location of the evidence, information about any change or disruption should be gathered from anybody who entered the area prior to the arrival of the first responder or investigating officer. To stop any further scene disturbance and contamination of possible physical sources, the crime scene and any other location that might yield important evidence should be sealed off. The crime scene should not be open to unauthorized individuals, and everyone entering or departing should leave a record[6].



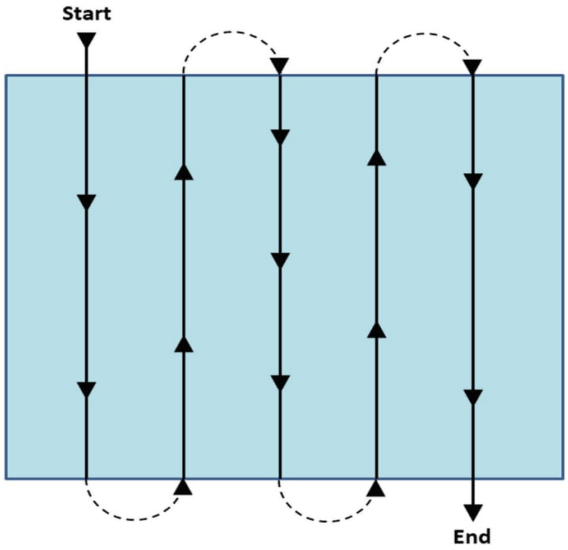
Crime Scene Searching Methods:

Identification and recovery of physical evidence is the main part of crime scene investigation. Regardless of the nature of the crime scene, the investigator must choose the best approach right away in order to gather the evidence as intact as possible. The following are the basic search techniques used at the crime scene[7]:

[6] https://www.researchgate.net/crime-scene-investigation
[7] https://ljrfvoice.com

Strip Method:

The strip approach establishes a reasonable outside limit of the search area by dividing the area into portions ranging from four to eight feet, depending on which is easiest. The searcher moves in a straight line from end to end of the search area, walking or bending to his knees. After that, the searcher turns around and follows the same route again. Until the entire area is searched, this process is repeated.[8]



The advantages of this method include:

A. Ensures that wide or open spaces are covered methodically.

B. Can be easily extended to include several rooms or spaces in a surroundings.

C. Reduces the possibility of missing important evidence by offering a clear and structured search method.

Drawbacks of this method:

A. For effective execution, a large team of investigators is needed.

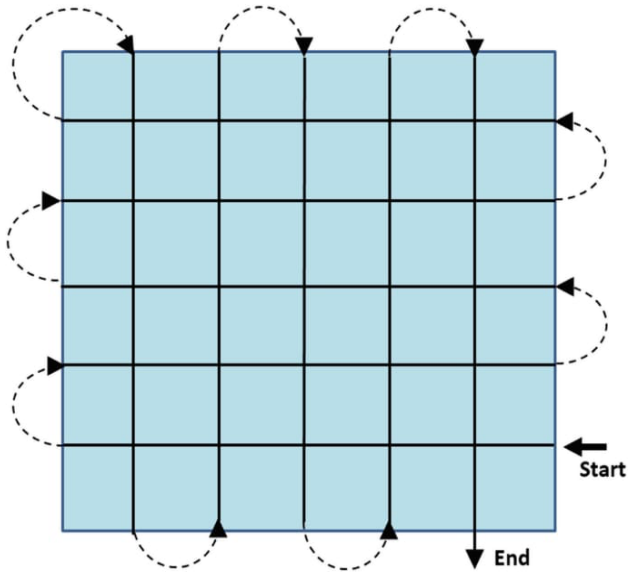
B. Might take a long time, especially when dealing with major crime scenes.

[8] W. Mark Dale, MBA and Wendy S. Becker, Ph.D., The Crime Scene: How Forensic Science works, Northeast Regional Forensics Institute, pg.no 47

C. Less appropriate for crime scenes that are indoors or have uneven shapes.[9]

Grid Method:

The grid technique and the strip method are identical; however, the searcher does a second strip method search perpendicular to the strip search pattern after the strip method is complete. It is also known as "double-strip method".[10]



The advantages of this method include:

A. Ensures full coverage by conducting two perpendicular searches of the region.

B. Reduces the possibility of missing important evidence.

The disadvantages include:

A. Double searching takes more time.

B. Needs a large number of workers to be as efficient as possible.

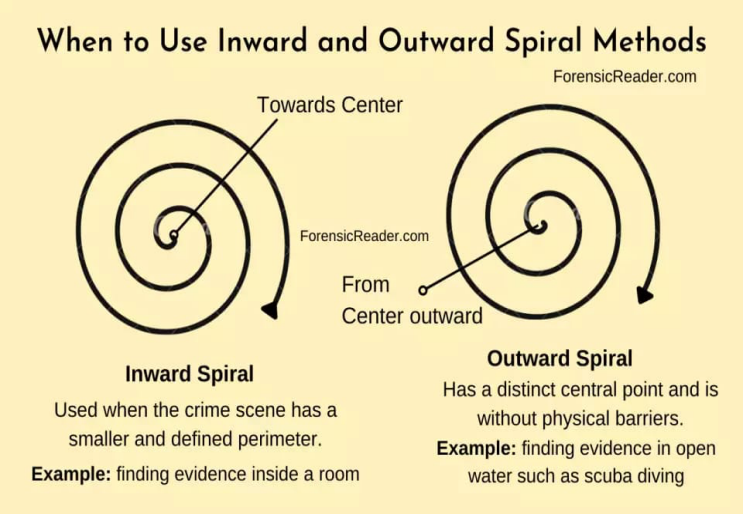
C. The possibility of contaminating the crime scene is further increased by physically

[9] https://ljrfvoice.com
[10] W. Mark Dale, MBA and Wendy S. Becker, Ph.D., The Crime Scene: How Forensic Science works, Northeast Regional Forensics Institute, pg.no 47

marking in two steps.[11]

Spiral Method:

The spiral search approach is another technique that may be applied to indoors as well as outdoors. Typically, the spiral search starts at the scene's outer edge and moves inward in a tight circle. One person using this approach in a tiny indoor environment is very suitable.[12]



The advantages of this method include:

A. There must be only one searcher.

B. A method for conducting a thorough search of crime scenes

The drawbacks are:

A. Searchers must be attentive at all times.

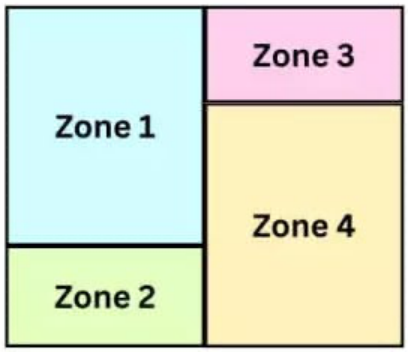
B. Can lead to confusion because of the circular motion.

C. Following their imaginary spiral lines may cause investigators to miss some evidence.[13]

[11] https://ljrfvoice.com
[12] James N. Gilbert, Criminal Investigation, Seventh edition, pg.no 89
[13] https://ljrfvoice.com

Zonal method:

Search techniques created specifically to cover big regions are needed for outdoor scenes or extremely large indoors. For this, the sector search approach is commonly used. The scene is divided into equal sections or zones using this procedure. Each sector typically has one searcher assigned to it who is in charge of everything that takes place there.[14]



The advantages of this include:

A. Makes it possible to search large crime scenes in a more methodical and structured manner.

B. For full coverage, use additional search techniques in each zone, such as spirals and strips.

C. Makes it easier to keep track of which zones have been checked and by whom, guaranteeing that no places are missed.

The drawbacks are:

A. Might take a long time, especially for complex or large-scale crime scenes.

B. Requires appropriate zone identification and documentation to prevent misunderstandings or overlap.

C. For effective implementation, a bigger team of investigators might be needed.[15]

[14] James N. Gilbert, Criminal Investigation, Seventh edition, pg.no 89, 90
[15] https://ljrfvoice.com

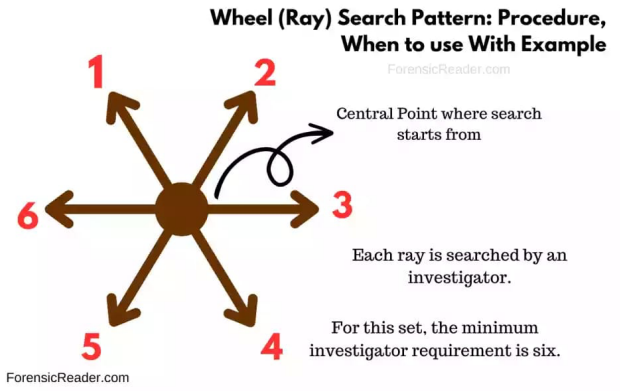
Wheel Search Method:

Alternatively referred to as the "pie" or "ray" search pattern. By following this pattern, crime scene investigators begin at a crucial location, like the body, then go outward in straight lines or rays. Usually, this approach is reserved for special circumstances. It has few applications and is challenging to utilize in large searches.[16]

The advantages of this method include:

A. Cover a lot of ground quickly. Simple to arrange.

B. No lines or identifying zones.



The drawbacks are:

A. Greater likelihood of losing important evidence.

B. Unsuitable for searching crime scenes with scattered evidence.

C. Secondary search from different search techniques is required.

Random Search Method:

Because it may be used anywhere, this is the approach that investigators use the most frequently. This approach does not require adherence to the aforementioned rule. This approach should also be taken into account for complicated crime scenes. Finding evident pieces of

[16] Roy Fenoff, Jacqueline T. Fish, Larry S. Miller, Edward W. Wallace and Michael C. Braswell, Crime Scene Investigation, Fourth Edition, pg.no 56

evidence, such weapons, damaged objects, or apparent traces, is the main goal of the first quasi-search. It is typically carried out prior to the crime scene being officially documented. Before beginning documentation, this search helps investigators get to know with the structure of the crime scene. Investigators can gain a basic knowledge of the crime from the preliminary search, which helps them plan their strategy for the more thorough investigation that follows.

The advantages of this method include:

A. Comparatively rapid and effective.

B. The most effective way to begin documenting any crime scene.

C. Helps to Find the most important pieces of evidence.

D. Aids in familiarizing investigators with the crime scene.

The drawbacks are:

A. Could fail to find evidence that is hidden or less evident.

B. Other evidence may unintentionally become contaminated as a result of the focus on noticeable items.

Intensive Search Method:

The intensive search is carried out following documentation, such as notes, sketches, and photos, but before the actual gathering and packaging of evidence starts. They are combined with other searches like zone, grid, and spiral. They have been shown to be more suitable indoors or at crime scenes with lots of objects and small spaces. There is a degree of intrusiveness to intensive searches; in order to prevent damaging evidence, increase the level of intrusiveness.

Here are examples of various levels of intrusiveness:

Least intrusive search method :

The least intrusive search method involves documenting and gathering information after searching the crime scene with the naked eye or a lighting tool (ALS) without touching any

objects.

More invasive Method:

After preliminary documentation and collecting, objects such as clothing, furniture, and other items are moved to reveal items that are hidden or less visible.

Most intrusive Method:

The most invasive method is destroying or damaging objects found at the crime scene in order to gather evidence. For instance, cutting sections of carpet with a bloodstain pattern, drilling holes in the wall to recover missiles, etc.

The advantages of this method include:

A. Retrieval of concealed evidence that might have been missed in the initial search.

B. An analysis of the crime scene in detail.

C. Can be connected to a thorough and precise study.

D. Minimize the possibility of crucial evidence being overlooked.

The drawbacks include:

A. It takes a lot of time, particularly if there are a lot of objects and secret locations.

B. It takes a lot of time to record and take pictures of every degree of intrusiveness during the search.

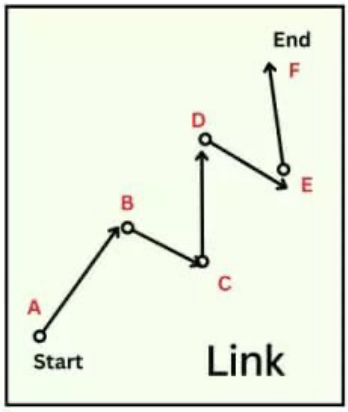
C. To prevent contamination, some evidence needs to be handled by professionals.

D. Need more resources, such specialized equipment and a specialized CSE.

E. The objects in question from the crime scene may need to be physically damaged in order to conduct the most invasive searches.

Link (Point-to-Point) Search Method:

By first assessing the different focus points inside the crime scene and then documenting and transmitting one after the other, link search methods concentrate on tracing a trail of evidence. Using this approach, the search starts at the first point of interest, such the front door or the evidence, and moves on to the next. This process keeps going back and forth until every topic of interest is covered. When there are several sites of interest at a crime scene and investigators need to create multiple routes to follow, this approach works well.



The advantages of this method include:

A. Reduces evidence loss or destruction by assisting in the establishment of clear walking routes.

B. Enables a methodical search of the crime scene that is concentrated on many places of interest.

The drawbacks are:

A. Can take a lot of time, particularly if there are numerous points of interest.

B. Demands attention to prevent deviating from approved routes.

C. For crime scenes with limited areas of interest, it might not be appropriate.[17]

[17] https://ljrfvoice.com

Documentation of the Crime Scene:

Observing and documenting the crime scene serves the dual purposes of mentally preparing and outlining the process for the examination of the scene as well as noting the location of any evidence. Conditions at the crime scene, including lighting (on/off), newspapers, on the door or inside the house, curtains (open/closed), weather, temperature, furniture movement or other disturbances made during life-saving efforts, conditions that would support or refute suicide or self-defence (gunshot residue, firearm position in cases of shooting), etc., should be closely observed and documented. Additionally, it's critical to be able to identify items that should be at the crime scene but aren't, such as the victim's purse, watch, ornaments, vehicle etc.

In the same way, items that seem out of place and may have been left by the offender should be noted. Details like the license (identity) number, key position, gear shift position, steering position, meter reading, fuel level, lights on or off, etc., should be documented if a vehicle is involved in a crime. On hard floors, the oblique lighting approach is a useful indoor lighting method. A decent flashlight with a powerful, focused beam was all that was required for this procedure. Make use of this light, which is nearly parallel to the floor and simply stretches out across it.

After that, the light is adjusted. Any evidence, including shoe prints and trace evidence, will show up dramatically even though they might not be apparent at all in regular lighting. The ceiling should be thoroughly examined in addition to the floor. It can pick up important evidence like bullet holes and bloodstains. The conditions of crime scenes can be documented using photography and videography. It may offer a clearer view of the layout of the crime scene. In order to demonstrate the shape, size, and location of the evidence as well as its significance to the crime scene, photography and videography should start with a broad overview of the scene and its surroundings. They will then use wide-angle and close-up (long, middle, and close-up range) shots to cover the crime scene.

1. **Note Taking:**

No other record will be as crucial to the investigator as the notebook, even if the investigator will prepare other documents to handle the crime scene. The investigator's personal reference for documenting the investigation is the notebook. Over time, numerous variations of police notebooks have been developed. If a scrap of paper was the only paper available at the time,

the court may occasionally even accept police notes written on it. But outside of critical circumstances, police notes and notebooks are generally acknowledged to have the following parameters in operational investigations:

A. A book with a cover page that includes the name of the investigator, the start and end dates of the notebook

B. Page numbers that are sequential

C. A booklet that is bound and whose pages cannot be torn without being noticed.

D. Lined pages that make it possible to write notes neatly

E. A time, date, and case reference should appear at the beginning of each notebook entry.

F. There should never be blank spaces on pages between entries; if they do occur, they should be filled up with a single line, a diagonal line across a page, or a partial page space.

G. If you make any mistakes in the notebook, you should merely cross them out with a single line drawing through them; don't make the mistakes unreadable.

The investigator's notebook serves as their best source of information in court. The court will permit an investigator to recollect events and acts during their testimony by consulting notes recorded at the time. The court is given a circumstantial assurance or truthfulness that the evidence is accurate and truthful when it examines an investigator's notebook and finds notes that support the investigator's testimony. Alternatively, the defence will examine the material more closely if important parts of the investigation are improperly documented or are absent from the notebook. In its final decisions to determine proof beyond a reasonable doubt, the court may give those unrecorded facts less weight.

Good notes give the investigator a summary of what was seen, heard, and done. The investigator's mental picture of the events leading up to the formation of reasonable grounds for an arrest and charges is displayed in a timeline of notes. Court trials are sometimes prolonged by appeals, adjournments, or suspects avoiding immediate apprehension. This may result in a prolonged delay between the inquiry and the trial. It becomes crucial for the

investigator to have thorough notes that accurately reflect their inquiry in these lengthy instances in order to help them recall the facts.

Even though the notebook is crucial, note-taking techniques are frequently overlooked in police training. The majority of police investigators improve their note-taking techniques and personal abilities through on-the-job training and the "trial by fire" of cross-examination in court. The wide number of situations in which taking notes must occur and the impossibility of predicting which information will become significant in any scenario are probably the causes of this gap in note-taking skill training. Therefore, in order for investigators to become efficient at identifying what to note in their notebook, a combination of training, common sense, and experience will be required.

The concept of "notes made at the time of an event" is a little deceptive and needs to be clarified. In a perfect world, an investigator could work through an investigation with an open notebook, documenting every fact and observation as it happened. Of course, the course of events is dynamic and unpredictable. Situations frequently call for an investigator to give their all in an attempt to control a crisis while preserving people's lives and safety. An open notebook has no place in these situations, and the investigator is obviously not taking any notes at the moment. Instead, they will do it as soon as it is possible to do so, after the incident has been brought under control. Although notes produced at the time are usually referred to in court, in reality, they are notes written as soon as is practical given the particulars of the incident.

The operational dynamics for investigators are accepted by the courts, and it occasionally comes up during the trial as a question as to when the notes were actually written. An investigator should therefore be ready to respond to this query at all times. It serves as a reference to show knowledge and attention to this issue to have a note in the notebook about the time the notes were written and completed.

The problem of facts that were missed and then remembered after the first notes were finished is another problem associated with the notes taken at the time. There are limitations and imperfections in the human memory. Sometimes after finishing the first draft of their notes, an investigator would suddenly remember something they forgot. It is not appropriate in these situations to go back through the pages of notes taken at the time and try to add the information you remembered. Recording these later fact recalls should be done correctly by starting a new note page right away, using the current time and date, referring to the earlier case notes, the

prior time, date, and page number, and then recording the newly recalled fact or facts. Defense lawyers will thoroughly scrutinize these kinds of recalled facts and late entries, and it can occasionally be beneficial if the investigator can additionally note the fact or circumstances that led to the remembrance of the extra information. When the situation is under control, investigators are observed writing diligently to record their memories of the events. This is evident to everyone who has ever been involved in a major crisis where life and safety have come first. Anyone who has ever been involved in a critical incident where life and safety were the top priorities will tell you that once the situation is under control, investigators may be seen carefully recording their memories of what happened.

The following techniques are suggested as a broad framework for taking notes:

1. Create a broad overview at the beginning of your notes, then proceed from the general to the more detailed findings. In order to start an investigation, you are forming an opinion about the facts that have been presented to you. These broad facts serve as the foundation for your mental map of occurrences, which will serve as the framework for thinking about identifying offenses and creating justifiable beliefs and actions.

2. More precisely, start writing down all dates, times, and descriptions of people, locations, and vehicles as they appear, to the best of your ability. It's possible that you have already begun a page in your notebook with precise times, addresses, license plate numbers, names or individuals, and possibly even a suspect's uttered words. It is permissible to use these important bits of previously recorded information to expand your thorough notes after the conclusion of the event in a more thorough manner.

3. Note who you met, who you spoke with, and how you confirmed each person's identity. For instance: Observe Jane Doe (birthdate: May 8, 64) 34345-8 Anywhere in British Columbia Driver's license ID photo.

4. To provide a true picture of the facts being communicated, document every statement made by victims and witnesses. Most of the time, it is not required to take notes on every comment made, and it is frequently not practical to do so. The exact statement given by a victim or witness can now be digitally recorded thanks to technology. However, just digitally capturing a statement is insufficient because remarks are often taken into account when determining reasonable grounds for belief to take action. By documenting the important

information being conveyed, a written record of the facts deemed to provide reasonable grounds for belief.

5. Suspects are frequently found at crime scenes pretending to be witnesses or even victims, and accurately recording their initial statements can provide evidence of guilt in the form of provably false or even incriminating statements. If someone is a suspect or could become a suspect, try your best to record any statements they make directly.

Every investigator has a personal obligation to record their own impression and memory of the thing they are observing as it happens. When investigators have worked together to develop an agreed-upon version of events and have written their notes to reflect those agreed-upon facts, the notes are no longer the investigator's personal recollection and can therefore be scrutinized as a collective version of events intended to produce evidence that does not accurately reflect the facts as each individual investigator witnessed them.

When investigators' separate notebooks are identical or almost identical in format and content, the defence can uncover this practice, which is commonly referred to as "boxing of notes." One of the shortcomings in investigative techniques that can result in injustices is the boxing of notes (Salhany, 2008). Therefore, it is best to avoid having investigators work together when taking notes. If there is ever a cooperative effort to revisit a problem together and reexamine tangible evidence to make the argument clearer for each investigator, such cooperative effort should be recorded in each investigator's note-taking.

There are times when an collective note-making procedure is employed and is deemed reasonable, notwithstanding this warning against the practice. This happens during extensive, multi-participant activities that are occasionally managed by an Emergency operations Command Center. Participants in the command center must be fully focused on managing things in these situations, which could take hours or days. It would be impractical and maybe inaccurate for each participant to wait until the lengthy event was over before taking their own notes. To replace individual note-taking in these situations, it is now standard operating procedure to designate one person in the command center to serve as the collective note-maker. "The Scribe" is the person who takes notes in these circumstances. For the persons in the command centre to be aware of the notes being made, the Scribe does not make notes into a typical notebook. In these situations, the notes are written on huge sheets of flipchart paper, and each finished page is displayed on the command center wall so that everyone can review

the information and confirm that the notes are accurate. After the procedure, the scribe saves the note pages as an exhibit and takes a picture of the entire collection of pages. Participants frequently initial each page. Each command center participant may use these notes as a reference document for court proceedings under this process.[18]

2. Photography:

Photography should be used as part of the documentation for all physical crime scenes, including traffic collisions, burglaries, homicides, or any number of crimes against people or property. Photographs, however, can be misleading and confusing to the viewer. Therefore, crime scene photographers must ensure their work is both ethical and honest while capturing as much accurate information and detail as possible. Documenting all elements of a crime scene is a major stepping stone when trying to piece together what happened, how it happened and who did it.

Crime scenes are always busy and frequently unpredictable, with investigators starting their work and first responders helping victims. Capturing photographic evidence can be difficult, even under the best of circumstances. An skilled photographer will understand that it's better to have too many photos than not enough, and that they should take pictures at every level of the inquiry. The following steps are taken to ensure proper photographic documentation:

A. Secure the scene:

Securing the crime scene is the first step in every forensic investigation.

B. Evaluate conditions:

After that, the photographer should assess the lighting and weather conditions and modify the camera settings accordingly. Since crime scenes can occur indoors, outdoors, or in a combination of locations, including vehicles, multiple rooms, or any combination of locations, no single camera setting will be suitable for every crime scene.

C. Shoot the scene:

Before anything is altered, the photographer should take pictures, gradually moving from

[18] https://pressbooks.bccampus.ca/criminalinvestigation/chapter-8-crime-scene-management/

outside to close-up shots of the situation. To demonstrate how the evidence relates to the scene as a whole, numerous shots should be taken, ranging from medium shots to the entire scenario. The crime scene photographer should take wide-angle shots of the entire scene from the approach and through every area, just as a television program would show the viewer the outside of a building to establish where the characters are going. Close-up images of evidence can be taken out of context, so establishing the scene first with wide and medium shots is crucial. In order to capture any evidence or environmental factors that might be above the scene, photos should also be taken looking up from the scene.

D. Photograph the victims:

If victims are present, they should be included in the following set of photos to demonstrate their locations, conditions, and injuries.

E. Photograph the evidence:

Each piece of evidence should then be photographed to show where it was found. This establishes the relationships between the evidence and the victim, the victim and the room, and so on. These photos should be taken from straight above or straight on at right angles to eliminate any potential distance distortions. Each piece of evidence should be photographed both with and without a scale to indicate size.

F. Evidence markers:

In order to demonstrate that no one has interfered with the crime scene, photos should be taken both before and after evidence markers are set.

G. Re-shoot for new evidence:

The complete sequence of images, including all evidence pictures, should be replayed whenever investigators mark fresh evidence. These images should show the entire item of evidence along with a scale to indicate size.

Fingerprints, indentations, shoe and tire track impressions, vehicle identification numbers (VIN), and very small pieces of evidence should all be captured using special imaging techniques and lighting. These techniques may include:

- Alternate light sources(ALS) – such as lasers, blue or green lights, and colored filters that illuminate for photography and aid in the detection of processed latent fingerprints or other hidden evidence.

- Oblique angle lighting - use of a camera flash, flashlight, or ALS at a very low angle to create shadows that make it possible to take a picture of an impression or imprint.

- Macro lenses - may capture extremely detailed pictures (1:1 or 1:2) of tiny objects like tool marks or trace evidence.

Photographs should accurately capture the lighting conditions at the scene. If necessary, a photographer will add artificial light, such as a flash, to compensate for a camera's limitations in recording the visible range of light under specific conditions.

H. Shoot fast:

Environmental factors like rain, snow, or traffic can occasionally make shooting challenging. The photographer must respond fast to get as much visual record as possible from a deteriorating situation.

I. Photograph the victim later:

The photographer can return to document the victim's injuries if they need to be transported or receive care. A variety of approaches, including the use of colored filters and unique lighting, can highlight the healing status and injuries (such as bruising and scarring).

Type of Equipment Used:

When taking pictures of a crime scene, investigators and technicians should have access to a high-quality camera with manual override capabilities, interchangeable lenses, an off-camera flash, cable release, and a tripod mount. With these tools and a widely attainable level of training and practice, high-quality photos can be taken in a variety of situations, such as low light, highly reflective surfaces, and narrow spaces. Nevertheless, a lot of first responders have simple, consumer-grade point-and-shoot cameras. They may be in the ideal position to obtain crucial evidence, so it's critical that they understand how to use their camera and take pictures. A first responder with basic photography training can provide photographs of adequate quality

to support an investigation even with basic equipment.

It is not advised to use cell phones or other personal electronics with built-in cameras unless it is absolutely necessary. An illustration would be if a muddy shoe print was discovered close to a crime scene when it was raining. If a mobile phone camera is the only one available, using it would be operationally essential because the shoe print might vanish soon.[19]

Importance of forensic photography in criminal investigation:

Providing precise evidence to the court so that the victim can receive justice is the primary goal of forensic photography, often known as crime scene photography. This is essential for assisting crime investigators in fully understanding what the crime scene actually looks like. If reconstruction is necessary, it will be very beneficial to use photos and recreate the scene according to the photos. If the investigating officer moves to a new office, they will be able to assign the specific case. After then, he or she will review the old photos and videos to better understand them. If the case proceeds to trial, the photographs may also be crucial, and a court may decide to penalize the offending party. Aside from that, the digital camera has been improved, allowing us to capture many photos with a fast light source, making it very simple to take pictures of the evidence.[20]

3. Videography:

The process of capturing a crime scene's structure, sequence, and context while it is in motion using specialized video equipment is known as crime scene videography. In contrast to still photos, video offers a continuous, 360-degree view that lets viewers see the scenario as investigators initially saw it. Beginning with broad views of the surroundings and then getting closer to specific bits of evidence, the videographer records the entire area. This method makes sure that angles, distances, and object relationships are maintained. Instead than taking the role of photography, videography is intended to enhance it by providing a more thorough understanding of the crime scene. To ensure that recordings are accurate, impartial, and admissible in court, proper videography adheres to strict forensic procedures.

[19] https://www.forensicscienceimplified.org/photo/Photography.pdf
[20] https://www.researchgate.net/TheRoleofForensicPhotography

Importance of videography in crime scene:

The potential of videography to produce a live record of the crime scene is what makes it so important. Videos enable investigators to examine the scene as a whole, analyse the arrangement of evidence, and comprehend the spatial relationships between objects, in contrast to images that capture isolated events. For instance, a video can display the entry and exit points of a crime scene or the distance between a weapon and a body. When recreating events and presenting arguments in court, this contextual clarity frequently proves essential. Additionally, videography lessens disagreements over interpretation by preserving the accuracy of the data. Judges benefit from witnessing the crime scene as investigators did during trials, which strengthens and clarifies the case. In the end, videography improves forensic investigations' accuracy, transparency, and trustworthiness.

Key Techniques in Crime Scene Videography:

To guarantee thorough filming, a competent crime scene videographer takes a methodical approach. An external view of the setting that shows the surrounds and entry points is typically the first step in the process. After that, the camera gently and steadily advances inside to take close-up, mid-range, and wide pictures. In order to give the film context, narration may contain the case number, date, location, and summaries of the evidence. Additionally, since they potentially compromise authenticity, editing and special effects are prohibited. Clarity can be attained by using strategies like slow panning, zooming only when needed, and staying focused. Every action is deliberate, guaranteeing that the video becomes a reliable, objective document of the crime scene.

Benefits of Crime Scene Videography:

Beyond simply capturing evidence, crime scene videography has other benefits.

It aids in:

- Maintaining the scene's visual reliability before it is disturbed or changed.
- Demonstrating the spatial links between objects to provide clarity.
- Strengthening legal claims since videos are convincing in court.

- For training purposes, investigators can learn from actual case video.
- Supporting professionals in event simulation and reconstructions.

Videography improves the accuracy of investigations by combining context and detail. It guarantees that nothing is missed, strengthens testimony, and improves the credibility and interest of evidence presented.[21]

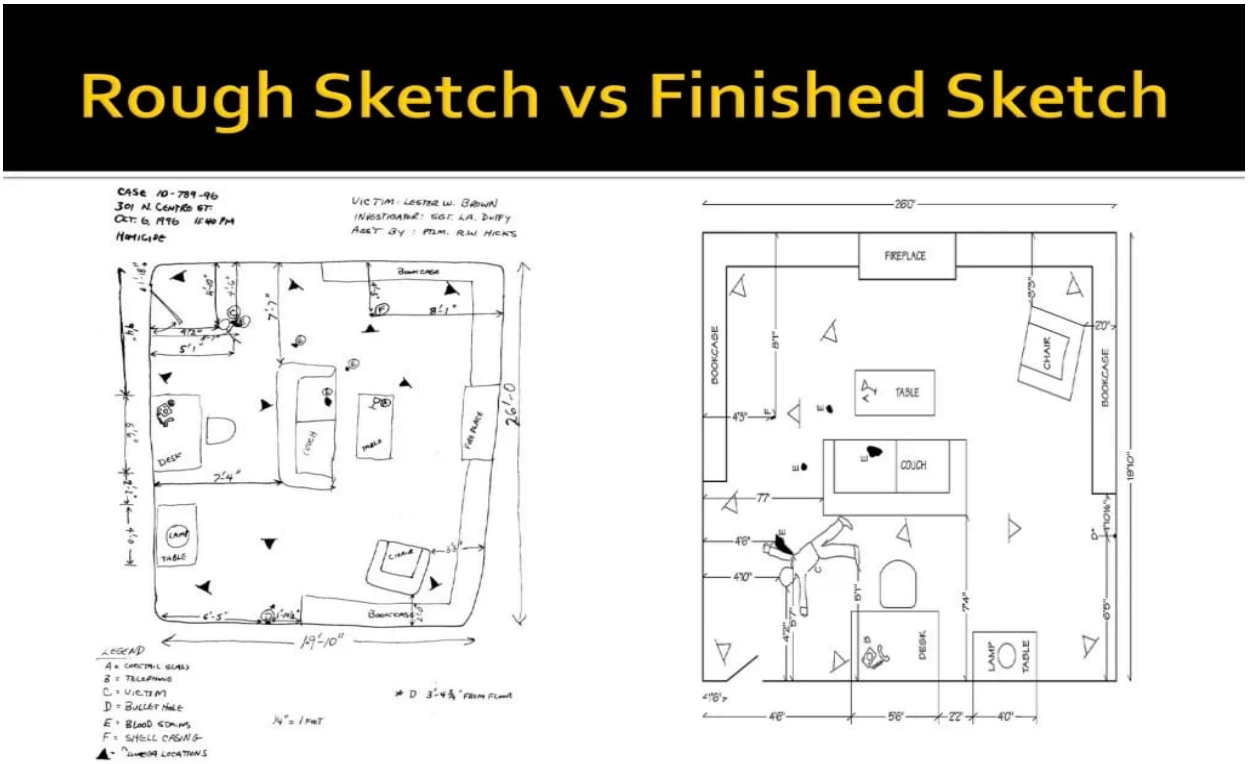
4. Sketching of the Crime Scene:

If the crime scene has previously been photographed or videotaped, why should it still be sketched? When creating investigative reports and questioning suspects and witnesses, sketches come in handy. Additionally, sketches are great photographic companions. Sketches give precise information on the placement of objects and illustrate the relationships and distances between them, whereas pictures provide precise details. An investigator's memory can be refreshed by using sketches, which can also help the prosecution and judge grasp the conditions at the crime scene, represent the relationship of objects to the surrounding area, and improve images of the scene.

According to Geberth (2006), a sketch or diagram must fulfill the following conditions in order to be admitted in court: It needs to be included in the testimony of a qualified individual. It needs to remember what the person who prepared it witnessed. It has to accurately portray the location or scene.

When sketching a crime scene, the necessary physical evidence found within the scene and the overall screen are given the appropriate perspective and units of measurement. It's not hard to sketch a crime scene, but the investigator must be organized and plan ahead. There are two kinds of crime scene sketches: Finished or final sketches and rough sketches.[22]

[21] https://www.sifsindia.com/blog-details/significance-of-crime-scene-videography
[22] Bruce L. Berg, Criminal Investigation, Fourth Edition, pg.no 39, 40



Measurements for the crime scene sketch can be taken using three different methods:

1. **Triangulation:**

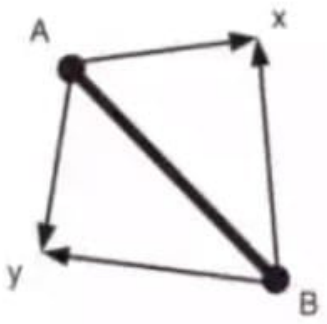
This is the most precise mapping technique that doesn't rely on modern technology. However, it takes a lot more time and effort. The triangulation method measures the locations of evidence using two fixed points (A and B). These fixed sites are frequently immovable markers or permanent buildings. Primarily used: Frequently used in interior crime scenes with various points of reference.

Procedure:

- Measure the distance between point A and the evidence (points x and y).
- Find the distance between the evidence and point B.

This forms a triangle that makes it possible to plot the evidence precisely on a sketch.

Triangulation
Points A and B are fixed.
Evidence x and y are measured from A and B.



Advantages:

• Extremely accurate, particularly for situations that located indoors or with easily accessible fixed positions.

• Helpful for graphing several pieces of evidence or areas with unusual shapes.

Examples:

* Indoor Crime Scene: The corners of a room where a robbery took place could serve as fixed points A and B. These points are used to measure the locations of a dropped wallet and a shattered vase, forming a triangle for each piece of evidence.

* Vehicle Collision Scene: During an automobile accident instance, two permanent points could be the locations of street lampposts. These points are used to measure the locations of skid marks and vehicle debris.

2. Base line (fixed line):

It is the simplest and least precise method of graphing crime scenes. In the baseline approach, two fixed sites (A and B) are connected by a straight line. To find evidence, measurements are made perpendicular to and along this line.

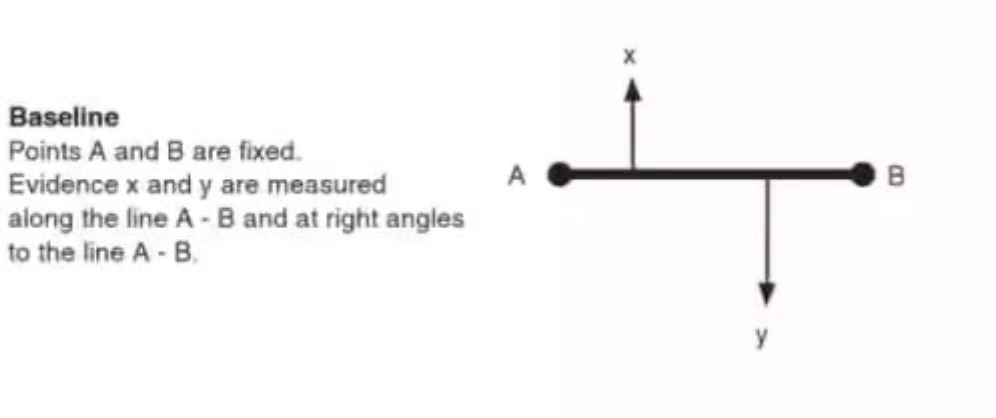
Mostly Used: Perfect for crimes committed outside scenes or when it is possible to establish a straight, clear reference line.

Procedure:

• Between two fixed places, draw a baseline.

• Calculate the distance between a point directly perpendicular to the evidence (x) and point A along the baseline.

• Calculate the distance (y) perpendicular to the evidence from the baseline.



Advantages:

* Easy to use and quick.

* Ideal for wide spaces with few fixed points or outdoor settings.

Examples:

* Outdoor Crime Scene: A baseline is set between two trees at a park where an assault occurred. A weapon's and an article of clothing's placements are measured both at right angles to and along this baseline.

* Warehouse Scene: A baseline is established between two walls in a large warehouse where stealing took place. Footprints with dropped objects are examples of evidence that are measured along this baseline.

3. Polar co-ordinators:

The polar coordinate approach determines the angle and distance between the evidence

and a fixed point.

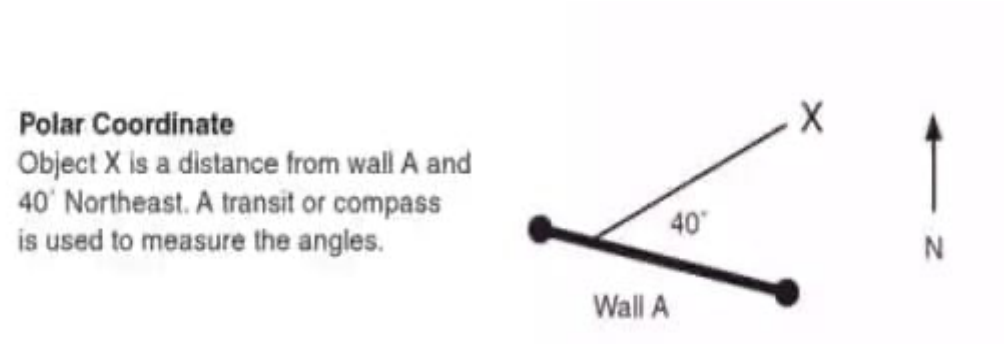
Primarily used: Frequently used outdoor situations where it is challenging or impractical to construct a straight baseline.

Procedure:

* Decide on a fixed place, such as Wall A.

* Calculate the separation between the evidence (X) and the fixed point.

* Using a transit or compass, determine the angle (for example, 40° Northeast).



Advantages:

* Beneficial for big or asymmetrical crime scenes.

* Useful when evidence is dispersed across a large area.

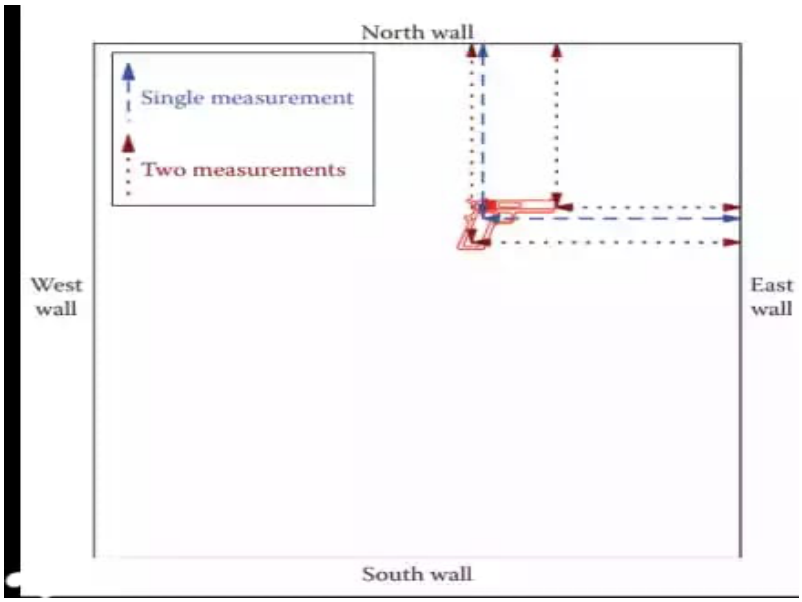
Examples:

* Forest Crime Scene: A big tree is chosen as the fixed point when a body is discovered in a forest. This tree is used to estimate the angle and distance to the body and a close object of clothing.

* Field Scene: A barn wall acts as the fixed place in an open field where a crime was committed. Distances and angles from the barn wall are used to measure evidence, such as a set of tire tracks and a discarded weapon.

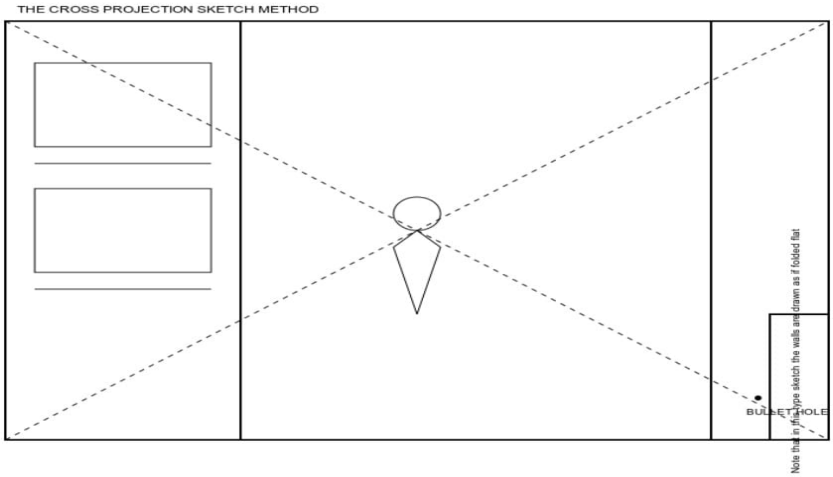
4. Rectangular Coordinate Method:

When there are perpendicular landmarks, such two walls, two curb lines, or two building edges, the rectangular coordinate system is helpful. If a fixed reference point (such as a utility box, fire hydrant, or telephone pole) is selected, it can be used even with non-perpendicular landmarks. measurements made in the cardinal directions (south/east, north/west, north/east, and south/west). Perfect for situations that take place indoors or in spaces with various, linear boundaries. Because of the possibility of perpendicular problems, the rectangular coordinate approach is less accurate than the triangulation method.



5. Cross-Projection Method:

When the objects or locations of interest are on or in the wall surfaces as well as elsewhere in an enclosed environment, the Cross-Projection Method can be helpful. In a cross-projection sketch, the doors, windows, and walls are depicted as if the walls had been folded flat on the ground. Next, a sketch is made of the measurements from a specific spot on the floor to the wall.



Examples:

* Hotel Room Murder: The cross-projection method is applied when a body is discovered in a small hotel room. The victim's bed is depicted in the floor plan, and the unfolded walls show fingerprints on the door handle on the south wall, a shattered lamp on the east wall, and a pattern of blood spatter on the north wall. [23]

The notes and photos acquired during the crime scene investigation are enhanced by a crime scene sketch. The sketch's goal is to convey precise information, not necessarily to be visually appealing. A straightforward line sketch with precise measurements is adequate. Certain outdoor dimensions can be calculated or derived from an automobile's odometer. However, exact measurements and an exact representation of the crime scene are crucial for a final report sketch. The first step in sketch preparation is to take a broad overview of the situation and choose which details to include. Next, the researcher has to choose a scale. Generally speaking, make an effort to use the largest scale you can. Divide the scene's longest measurement by the sketching paper's longest measurement to choose the appropriate scale. Paper measuring 81/2 x 11 inches is used for the majority of reports and records. Consequently, if the scene's longest measurement is 100 feet. To ensure that the drawing fits properly inside the 11-inch length of the paper, let 1 inch equal 10 feet. Graph paper also makes it easier to draw objects while maintaining scale.

A compass or orienting compass arrow pointing north, a legend or key explaining the characters, numbers, or symbols used, and a note of the scale being used should be included in

[23] https://forensicmcq.com/main-crime-scene-sketching-methods/

every sketch. The Sketch should mention whether it is day or night by drawing sun or moon.[24]

Chain of custody:

The legal term "chain of custody" describes the order in which evidence must be handled in order for a case to be successfully investigated. The evidence will only be admissible in a court of law if it can be demonstrated in court that it was handled through the proper chain of custody. The chain of custody identifies who gathered the evidence from the crime scene (or any other location), who handled it, who examined and moved it, and where it was kept. This contains all of the evidence, whether it be electronic or physical.

Some common types of evidence include-

- Blood
- DNA samples (fingerprints, footprints)
- Documents
- Photographs
- Videos
- E-mails, text messages
- Internet history

Evidence cannot be produced in a court of law if it has been brought to the court after a chain of custody was broken. The chain of custody must always be upheld by designated individuals who are legally permitted to possess the evidence, such as police officers, forensic specialists, evidence technologists, court officers, etc. [25]

Elements of chain of custody:

As soon as the investigating officer (I.O.) takes possession of the seized item while

[24] Bruce L. Berg, Criminal Investigation, Fourth Edition, pg.no 39, 40
[25] https://blog.ipleaders.in/chain-of-custody/What_is_chain_of_custody

conducting the investigation, the chain of custody starts. The following are essential components of a confiscated object's chain of custody that need to be accurately recorded during an inquiry and forensic examination:

(i) A description of the evidence

(ii) Identification information or an unique case identifier (such as a case number or property number)

(iii) Where the evidence was seized or collected;

(iv) Where it was stored;

(v) Who was in possession of the evidence and why; and

(vi) Specifics of how the evidence was handled, such as analysis, sampling, and repackaging.

(vii) Information pertaining to time and date

(viii) Sealing details, including records pertaining to any seal removal or resealing

It is clear from the aforementioned requirements that the chain of custody consists of two essential components:

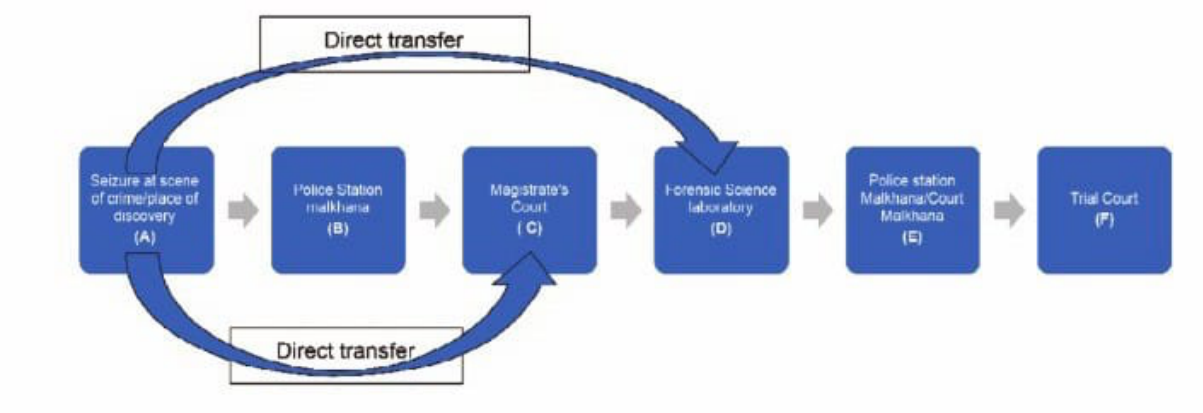
(i) Chronological:

Chronological, that is, the documentation of the order in which the confiscated object moved between its seizure and its presentation to the court during the trial. Every time the seized object is moved or transferred, it is required to record the date, time, and signatures of all parties involved.

(ii) Logical:

Logical meaning that different people's handling of the confiscated item such as possession, control, transportation, or analysis was justified and reasonable. Every transportation or transfer of a confiscated item must be made only for the purpose of an investigation, prosecution, and court appearance.

Both of the aforementioned conditions for evidence admissibility must be met by the chain of custody paperwork. The prosecution must prove during the trial that only properly identified and authorized individuals had custody of the seized item during the entire transit period from the point of seizure to the production before the court, and that all actions taken to transfer evidence from one person to another were for legitimate reasons. The following figure illustrates the typical transit of a confiscated item during an investigation and trial in India:



The type and quantity of objects, the requirement for forensic or expert examination, and the procedures used in a police organization all influence the movement pattern. When an object is moved from point A (the location of the seizure) to point F (the trial court), the chain of custody must cover possession of the object at all intermediate stages in addition to points A

and F. Since ownership of the item outside of points A and F is irrelevant for evidentiary purposes, the chain's length is important. [26]

Preservation, packaging and forwarding of biological evidences:

- Determine the evidence at the crime scene and place it in a container.
- After gathering evidence, do not handle it unreasonably.
- If paper bags, sheets, or envelopes are not totally dry when packed, they may stop a biological sample from deteriorating.

[26] https://www.researchgate.net/Chain_of_custody

- Printed paper should never be used since the ink could contaminate the displays.

- Every item needs to be packaged and labeled independently. Never combine more than one item.

- Each exhibit must be properly signed and sealed by the IO and labeled with the FIR number and date under section, the IO's name, the police station, the district, and the state.

- The labels must have the forwarding officer's signature and be sequentially numbered.

- The cover should be labeled rather than the evidence.

- A single box or outer covering should contain all of the packets that are part of a single case.

- Gather hair samples by picking them up with tweezers and putting them in tiny paper bags.

- The dried blood spots can be lifted with a cello tap or fingerprint tape, or they can be scraped on paper. Surface swabs, gauze, filter paper, and FTA cards wet with distilled water can also be used to gather this.

- For wet stains, use the cotton swab method mentioned above and place it in a paper bag once it has dried naturally.

- If the evidence is to be taken from a blood pool, lift the sample in an EDTA (ethylendiamine tetra acetic acid) vial using droppers or syringes, and then lift it on sterile-tipped foam surface swabs at the same time.

- Information from the included Performa should be included in the case forwarding note for forensic analysis of exhibits.

- Avoid using your bare hands to handle biological evidence due to health and safety risks.

NOTE: Items that are wet or moist should never be kept in paper or plastic containers for longer than two hours. Before packaging the items, they must be allowed to air dry. Avoid heating or

exposing the item to intense sunlight to dry stain substance.[27]

Common Components of a Crime scene investigation Kit:

* Fingerprint collection tools: Powder, brushes, lifting tape, fingerprint cards.

* Evidence collection bags and envelopes: For biological and trace materials.

* UV/Alternate light source flashlights: To detect bodily fluids or hidden markings.

* Measuring tools: For documenting evidence positioning and distances.

* Photography equipment: For crime scene documentation.

* Swabs and containers: For collecting DNA samples.

* Rubber Gloves, face masks, and PPE kits: For contamination prevention.

* Crime scene tape: To secure and define the scene.

* Markers and evidence tags: To label and number evidence items.

* Notebooks and pens: For taking field notes and sketching scenes.[28]

Judicial Decisions regarding the importance of Crime scene Investigation:

In Anil @ Anthony Arikswamy Joseph v. State of Maharashtra,[29] a 10-year-old boy was killed by strangulation following carnal intercourse. The case was resolved through DNA profiling using samples of the boy's semen taken from his pants and anal region as well as oral evidence, and the accused was given the death penalty.

In the murder case of Vishal Yadav v. State of UP,[30] Nitish Katara, even the parents had trouble identifying the deceased because the body was entirely burned, with the exception of a tiny portion of the hand. The accused was given a life sentence when the body was identified

[27] http://dfs.nic.in/pdfs/Forensic-Evidence-Guidelines
[28] https://www.scribd.com/presentation/Crime-Scene-Investigation-Kit
[29] 2014 AIR SCW 1334
[30]2025 AHC 187373

by DNA profiling and compared to the parents' DNA.[31]

In Gambhir Singh v. State of Uttar Pradesh,[32] the Supreme Court acquitted an individual who had been accused for murdering his six family members and his four children. He had been acquitted on the basis that investigative negligence as it lacks key elements like motive, last-seen evidence, deficient recoveries of evidence and Inadequate handling of evidence.[33]

Challenges faced during Crime Scene Investigation:

1. Difficulty in Securing and Protecting the Crime Scene:

One of the foremost challenges in crime scene investigation is the proper securing and protection of the scene. In many cases, there is a delay in police response, during which time bystanders, media personnel, or even relatives of the victim may enter and disturb the scene. First responders, including police officers, medical teams, or fire personnel, may unintentionally contaminate the area while attempting rescue operations. Inadequate barricading equipment and insufficient manpower further complicate scene control, particularly in crowded urban areas. If the scene is not properly secured at the initial stage, crucial evidence may be lost permanently.

2. Contamination and Destruction of Evidence:

Contamination remains a major concern in crime scene investigation. According to Locard's Exchange Principle, every contact leaves a trace; however, this principle also implies that investigators themselves may introduce foreign materials into the scene. Biological evidence such as blood, semen, saliva, and hair is highly susceptible to degradation due to environmental factors like rain, wind, sunlight, or humidity. Improper handling, failure to use gloves, or incorrect packaging methods may result in cross-contamination, thereby affecting forensic results and weakening evidentiary value in court.

3. Improper or Inadequate Search Methods:

The selection of an appropriate search method is crucial for systematic evidence recovery.

[31] https://www.lawjournals.net/pdf
[32] 2025 SC 175
[33] https://www.alec.co.in

However, investigators sometimes fail to apply structured search patterns such as grid, spiral, strip, or zone methods. Lack of proper lighting in night investigations, failure to use alternate light sources, and overreliance on visual inspection may lead to oversight of trace evidence. In complex or large crime scenes, the absence of coordination and planning can result in incomplete searches, ultimately affecting reconstruction of events.

4. Errors in Documentation:

Documentation forms the backbone of crime scene investigation. Inaccurate or incomplete note-making, poor-quality photography, absence of measurement scales in photographs, and unclear sketching may compromise the integrity of evidence. Failure to record the sequence of events, time of collection, and exact location of evidence may create inconsistencies. Since courts rely heavily on documentary records, any lapse in documentation can create reasonable doubt regarding the authenticity of evidence.

5. Breaks in Chain of Custody:

Maintaining the chain of custody is essential to ensure that evidence presented in court is the same as that collected from the crime scene. Challenges arise when evidence is improperly labeled, signatures are missing, documentation is incomplete, or there are delays in forwarding materials to forensic laboratories. Even minor discrepancies may be exploited by the defence to challenge admissibility. Therefore, strict procedural compliance is necessary to preserve evidentiary credibility.

6. Lack of Training and Expertise:

Another significant challenge is the lack of specialized training among first responders and investigating officers. Crime scene management requires scientific knowledge, technical skill, and familiarity with forensic tools. However, in many regions, officers handling crime scenes may not possess adequate forensic education. Although institutions such as the Central Forensic Science Laboratory and various State Forensic Science Laboratories provide scientific assistance, shortage of experts and heavy workload often lead to delays and reduced efficiency.

7. Technological and Infrastructure Constraints:

Modern crime scene investigation increasingly depends on advanced forensic technologies

such as DNA profiling, digital forensics, and alternate light sources. However, technological limitations, outdated equipment, insufficient laboratory facilities, and backlog of forensic reports pose serious challenges. Delays in receiving forensic results can slow down investigation and trial processes, affecting timely justice delivery.

8. Legal and Procedural Challenges:

Crime scene investigation must strictly comply with procedural laws and constitutional safeguards. Any deviation from prescribed procedures during search, seizure, or documentation may render evidence inadmissible. Defence counsel may question authenticity, voluntariness, or legality of evidence collection. Thus, procedural lapses not only weaken prosecution cases but may also lead to acquittals despite strong factual evidence.

9. Environmental and Situational Factors:

Environmental conditions significantly affect crime scene investigation. Outdoor scenes are vulnerable to weather disturbances, while fire-damaged scenes or decomposed bodies complicate evidence recovery. Mass disaster or multiple-victim situations require extensive coordination and resource allocation. Such circumstances increase the complexity of documentation, preservation, and reconstruction of events.

10. Human Factors and Cognitive Bias:

Human error and psychological factors also present challenges. Investigators may develop confirmation bias, focusing only on evidence that supports their initial theory. Pressure to solve high-profile cases quickly may compromise objectivity. Stress, fatigue, and emotional impact of violent crimes can further influence judgment, thereby affecting the quality of investigation**.**

My Findings:

The analysis indicates that proper protection of the crime scene is the foundational step in any criminal investigation. When a crime scene is not adequately secured immediately after the incident, the possibility of contamination, tampering, or loss of crucial traces increases significantly. Unauthorised entry of individuals, improper handling of materials, and failure to establish a secure perimeter often result in disturbance of the original condition of the scene.

Such disturbances weaken the accuracy of reconstruction of events and create doubts regarding the authenticity of the material collected during the investigation.

In addition, documentation plays a critical role in preserving the original condition of the crime scene. Inadequate note-making, incomplete photographic records, or absence of proper sketching can lead to loss of contextual information. Proper documentation through systematic notes, photography, videography, and sketches enables investigators and courts to understand the spatial relationships between objects and the sequence of events. When documentation is incomplete or poorly maintained, it becomes difficult to establish the credibility of the investigative process.

Furthermore, preservation of materials and maintenance of chain of custody are essential to ensure the integrity of the investigative process. Breaks in the chain of custody create uncertainty regarding whether the materials examined later are the same as those originally recovered. Courts have repeatedly emphasised that evidence must remain properly sealed, labelled, and documented from the time of recovery until it is presented during trial. Judicial observations in cases such as State of Rajasthan v. Teja Ram[34] and Manoj and Others v. State of Madhya Pradesh highlight the importance of maintaining proper custody and scientific handling during investigations. Therefore, the analysis supports the hypothesis that improper protection, inadequate documentation, and lapses in preservation procedures significantly undermine the reliability and integrity of criminal investigations.

The analysis reveals that lack of specialised training and insufficient technological resources are major factors contributing to procedural lapses during crime scene processing. Crime scene management requires a systematic and scientific approach, which includes identifying fragile traces, documenting the scene accurately, and preserving materials in a manner that prevents contamination. However, in many instances investigating officers may not receive adequate practical training in these specialised procedures.

Without proper training, first responders may unintentionally disturb or alter the scene while attempting to secure it. For example, failure to use protective equipment, improper packaging of materials, or lack of awareness regarding contamination risks can compromise the integrity of the investigation. Similarly, inadequate technological infrastructure—such as absence of

[34] AIR 1999 SC 1776

modern photography equipment, digital documentation systems, or forensic support—can hinder effective documentation and preservation.

Compared to international investigative systems where specialised crime scene units operate with advanced technology and trained personnel, many investigative agencies face limitations in infrastructure and resources. These constraints contribute to inconsistencies in the application of scientific investigation techniques. Therefore, the analysis indicates that lack of specialised training and technological infrastructure significantly contributes to procedural lapses in crime scene management.

The study indicates that although procedural guidelines exist for conducting crime scene searches and documentation, their implementation often varies across jurisdictions. Search methods such as grid search, spiral search, strip search, and zone search are designed to ensure systematic examination of the crime scene. However, the choice and execution of these methods frequently depend on the experience and discretion of individual investigators rather than strict adherence to standardised protocols.

Similarly, documentation practices such as note-making, photography, videography, and sketch preparation are sometimes carried out without uniform standards. In some cases, photographs may not capture the complete layout of the scene, while sketches may lack proper scale or measurements. These inconsistencies reduce the reliability of crime scene reconstruction and may weaken the overall investigative process.

The absence of uniform enforcement mechanisms and the lack of specialised crime scene units in certain jurisdictions contribute to these inconsistencies. Consequently, the analysis supports the hypothesis that standard operating procedures for crime scene search and documentation are not uniformly implemented across investigative jurisdictions.

The analysis demonstrates that strengthening documentation procedures and introducing digital systems for maintaining chain of custody can significantly improve the transparency and credibility of criminal investigations. Accurate documentation provides a permanent record of the original state of the crime scene and the investigative steps undertaken. When such documentation is systematic, detailed, and supported by visual records, it enables courts to verify the reliability of the investigative process.

Digital chain-of-custody systems further enhance accountability by maintaining a continuous and traceable record of the movement of materials from the crime scene to forensic laboratories and courts. These systems minimise the risk of tampering, loss, or substitution by recording every transfer and handling event electronically. Adoption of such systems can also improve coordination between investigators and forensic experts.

Therefore, strengthening documentation protocols and implementing digital chain-of-custody mechanisms would enhance investigative transparency and strengthen judicial confidence in the outcomes of criminal investigations.

My Suggestions:

Crime scene investigation forms the foundation of a successful criminal investigation, and any lapse at this stage can significantly affect the reliability of the entire case. In my view, one of the most important improvements required in crime scene investigation is the strengthening of specialised training for investigating officers. Many procedural mistakes occur because the first responders at the crime scene are not adequately trained in scientific evidence handling. Proper training programs, practical workshops, and simulation-based exercises should be conducted regularly so that officers develop the necessary skills in protecting the crime scene, identifying potential evidence, and preserving it without contamination. If investigators possess proper scientific knowledge and practical expertise, the chances of procedural lapses can be greatly reduced.

Another important suggestion is the greater integration of modern forensic technology in crime scene investigation. Traditional methods alone are often insufficient in complex criminal cases, and therefore advanced technological tools such as digital photography, 3D crime scene reconstruction, laser scanning, and improved DNA analysis techniques should be widely adopted. The use of such technologies can help investigators document the crime scene more accurately and preserve the details of the scene even after it has been cleared. In addition, portable forensic kits and mobile forensic laboratories can assist investigators in conducting preliminary examinations at the scene itself, which can help prevent the loss or deterioration of crucial evidence.

I also believe that strict adherence to standard operating procedures is essential for improving crime scene management. Every crime scene should be secured immediately to prevent

interference from unauthorised persons, including bystanders and media personnel. A systematic search method must be followed while examining the scene so that no potential evidence is overlooked. Proper documentation through photographs, sketches, notes, and detailed reports should also be maintained throughout the investigation. These measures ensure that the crime scene is handled in a professional and methodical manner, which strengthens the credibility of the evidence collected.

Further, maintaining a proper chain of custody for all collected evidence is extremely important. Evidence must be carefully packaged, labelled, sealed, and documented before it is transported to forensic laboratories. Each stage of handling the evidence should be recorded to ensure transparency and accountability. Any break in the chain of custody can raise doubts about the authenticity of the evidence and may weaken the prosecution's case during trial. Therefore, improved evidence management systems and digital tracking mechanisms should be introduced to ensure that the integrity of evidence is maintained from the crime scene to the courtroom.

In addition, better coordination between different agencies involved in the investigation can significantly enhance the effectiveness of crime scene management. Crime scene investigation is not the responsibility of a single officer but requires the cooperation of police personnel, forensic experts, medical professionals, and legal authorities. Effective communication and collaboration among these professionals can help ensure that the investigation is conducted in a comprehensive and scientifically sound manner.

Finally, there is a need for greater investment in forensic infrastructure and resources. Many investigative challenges arise due to the lack of well-equipped forensic laboratories, modern equipment, and trained personnel. Strengthening forensic infrastructure by establishing more laboratories, improving technological capabilities, and recruiting skilled forensic experts can greatly improve the quality and efficiency of crime scene investigations. By implementing these improvements, the overall reliability of criminal investigations can be enhanced, ultimately contributing to a more effective and fair criminal justice system.

Conclusion:

An essential component of any investigation is the examination of the crime scene. It is where logic, law, and science all come together. All items that can prove or disprove the

existence of a crime or establish a connection between a crime and its offender or victim are considered physical evidence. The crime site is where forensic science starts. In this case, investigators need to appropriately preserve and identify the evidence for laboratory testing. Securing the crime scene is the first responding officer's main responsibility. Following the site's protection measures, the appropriate investigators document the crime scene by taking pictures, sketching, and taking notes. The investigator should perform a preliminary analysis of the crime scene as left by the offender before processing it for physical evidence.

A crime scene must be thoroughly and methodically searched for tangible evidence. The size of the scene, the location, and the number of collectors involved in the search all influence the search pattern that is used. Anything from massive things to minute remnants might be considered physical evidence. Many pieces of evidence are frequently readily apparent, while others can only be identified through analysis in a crime labs. Because of this, it's crucial to gather potential carriers including clothing, vacuum sweeping, and nail clipping in addition to the more obvious objects. Every distinct or comparable item gathered from several locations needs to be put in its own container. Individually packaging evidence avoids both cross-contamination and contact damage.

A record of the evidence's whereabouts must be kept by the chain of custody at the time of evidence collection. For comparison at the crime scene and in the lab, adequate standard/reference samples, such as hair, a buccal swab, and fibre, must be taken from appropriate people. Following the proper search and seizure protocol is essential when removing any evidence from a person or crime scene. The investigator's lack of scientific expertise on how to properly gather, preserve, store, and transport crime scene evidence can lead to inappropriate analysis, which lowers the evidence's value in court. A biological sample's purity and quantity, rate and level of degradation, and other elements all play a part in producing a satisfactory report. "No biological evidence is immune to degradation." As a result, careful gathering and packaging of crime scene evidence might yield valuable insights. Therefore, it is crucial to take the right precautions when gathering and preserving evidence from crime scenes. It is hoped that this analysis would assist law enforcement and forensic experts in handling crime scene evidence to prevent contamination, deterioration, and loss of biological evidence's value.[35]

[35] https://www.researchgate.net/crime-scene-investigation

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