

Review Article

Role of Forensic Science in Crime Scene Investigation

Upasana Borah*

NEF Law College, Assam, India

*Corresponding author: Upasana Borah, NEF Law College, Assam, India

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Abstract

The scene of occurrence is the place where the criminal act has been reported to have taken place. After a crime is reported to the police, the investigation process is set into motion. Quite often, the success or failure of the entire criminal investigation will depend upon proper handling of the crime scene and processing of the evidence. The investigator who is very important person in every crime scene plays an active role and therefore must possess the knowledge and skill to preserve the evidence available at the crime scene. He must learn to recognize, identify, preserve and collect items of physical evidence. He must also be fully conversant with the legal as well as the scientific requirements in the collection of the evidence.

Crime Scene

The crime scene is not the domain of anyone but of the whole team. A scene of occurrence of a crime is the place where a particular crime has been committed or where physical evidence of such crime is found or taken place and first brought to the notice of the police. Thus, there are multi-point crime scenes in most of the cases. It is the starting point for the investigator, which provides him with the information on the victim and the suspect and to reconstruct the crime scene [1]. In short, crime scene is a site where some evidence relating to the commission of crime is found or exchanged. It is a place where the person/persons involved conducting a crime. The scene occurrence provides a wealth to clue material and other evidence which is useful to:

1. Establish Corpus Delicti;
2. Link the criminal, the victim and the scene of occurrence inter se;
3. Evaluate the pattern of events;
4. Indicate modus operandi, sequences of the event;
5. Help reconstruction of the occurrence;
6. Find the criminal(s), victim(s) and evidence;
7. Find the number of nature of weapons;
8. Know the transport used;
9. Ascertain the routes of ingress and egress.

The scene of occurrence of crime cannot be limited to one specific place; it may extend to more than one place. It may also not be limited to the surroundings but thus it extends to a wider area depending upon the nature of crime.

In a compact of crime, such as Burglary the scene may be divided into-

1. Line of approach,
2. Point of entry,
3. Actual Scene,

4. Point to Exit,
5. Line of retreat.

The scene may be classified into outdoor or indoor. A crime committed on a road or a field is an outdoor crime whereas the crime committed inside the house, car, building etc can be termed as indoor crime [2]. The crime of indoor and outdoor nature like theft, robbery, dacoity, homicide, rape, traffic accident have invariably physical evidence at their scenes because of intense physical activities involved in their commission. Physical Evidence found at the crime scene can be the key to the solution of a crime [3]. There may be certain types of crimes, which have no 'scene' at all. The crime of this nature are forgery, embezzlement etc.

Every Crime scene leaves a unique way of aspects for the examination of the scene. The opportunity to examine the crime scene of occurrence is available only once. If the same is not investigated properly the wealth of information is lost forever. This examination of scene of occurrence should help to answer these few questions-

1. How did the criminal and the victim reach the scene of occurrence?
2. What were the routes of exit and entrance?
3. What was the number of criminals and victims?
4. How was the crime committed and what are modus operandi?
5. What kind of evidence has been exchanged between the criminal and the victim?
6. Is that alleged scene of occurrence genuine or simulated?
7. When the crime was been committed?
8. Who were the criminals and victims?
9. Who did the criminal visit after committing the crime?
10. Why did the victim behave in a particular way?

Above listed are just the numbers of questions that used to arise while investigating the case but apart from these there are more unsolved mysteries of a case that will be busted out after the examination of the crime scene. Actions taken at the outset of an investigation at a

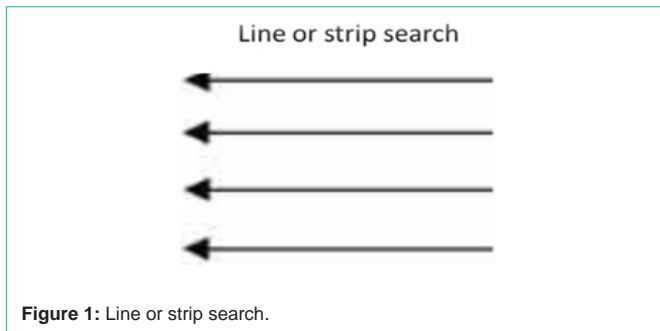


Figure 1: Line or strip search.

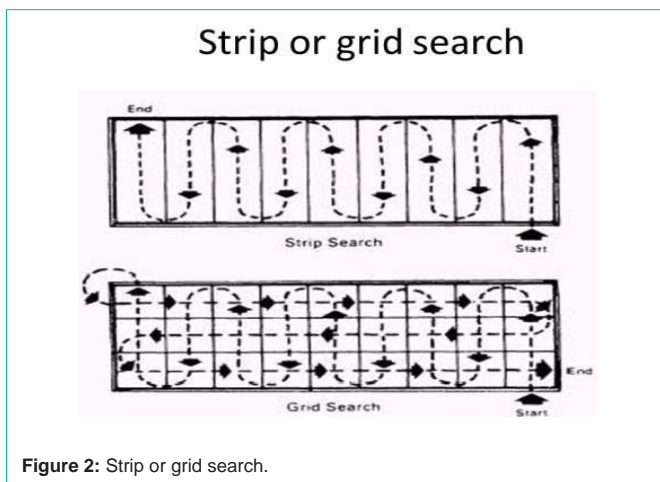


Figure 2: Strip or grid search.

crime scene lead to assure proper resolution of a case.

Research Methodology

This paper is primarily based research paper where I tend to treat the methodology of crime scene occurrence which gives a better insight of the topic and scope for research. The secondary data is been collected from websites, international journal and articles.

How a Crime Scene is Investigated?

All criminal investigation is concerned either with people or with things. Only people commit crime, but they invariably do so through the medium of things. It is these things that together constitute the broad field of physical evidence. Many investigations have failed in some degree to make the most efficient use of the physical evidence because of their neglect in looking for the physical evidence and placing reliance only on the people committing crimes. The circumstances that investigators encounter at the scene will largely dictate the approach used to process the scene. A HOMICIDE will likely require different treatment and processing than a BURGLARY [4]. However, to ensure a thorough process, the seven steps outlined below are often followed by the experts:

1. Establish the scene dimensions and identify potential safety and health hazards [5];
2. Establish Security;
3. Plan, Communicate and Coordinate;
4. Conduct a Primary survey;
5. Document and process the scene;

6. Conduct a Secondary survey;
7. Record and preserve evidence.

But the investigator must therefore have a balanced approach to the investigation of crime. For that he must understand:

1. What is physical Evidence?
2. How to collect and preserve it?
3. How and from where to obtain the information it carries?
4. How to interpret the information so obtained?

Samples Collected from Crime Scene and Preservation of Crime Scene

A wide variety of physical evidence can be collected at a scene that is deemed valuable (probative) for collection and investigation [6]:

- Biological Evidence (Eg: Blood, Body Fluids, and Hairs);
- Latent print Evidence (Eg: Footprints, Fingerprints, Plamprints);
- Footwear and Tire Track Evidence;
- Trace Evidence (Eg: Fibers, Vegetation);
- Digital Evidence (Eg: Call Records, Internet Logs, Emails);
- Drug Evidence;
- Firearm Evidence;
- Tool and Tool mark evidence.

The type of evidence collected will vary with the type of crime [7]. In the case of a Burglary it would be common to perform task in the order listed below. This will help to ensure that evidence isn't inadvertently damaged or destroyed:

1. The photograph and document of the crime scene;
2. Collect trace material especially from the point of entry;
3. Collect low level DNA evidence by swabbing areas of contact;
4. Collect all the items that may contain biological evidence;
5. Locate and collect latent fingerprints.

Proper evaluation of the scene of occurrence is very time consuming job so it requires being patience to get the proper result:

1. Protection of the crime scene;
2. Photography of the crime scene;
3. Sketching a rough idea of the crime scene;
4. Searching for evidence at the crime scene;
5. Handling clues;
6. Recording of the scenes of occurrence.

Preservation the crime scene is the most important task of the police until the Forensic Experts arrived. The first person arriving at the scene should be able to protect the scene from curious onlookers and the family members. He should isolate the area and mark it

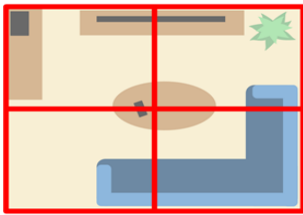


Figure 3: Multiple searches per zone.

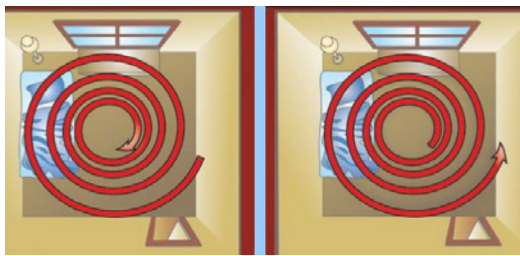


Figure 4: Spiral Search.

“CRIME SCENE: DO NOT CROSS”. Nothing on the scene should be touched, altered or changed by anyone until the investigating officers does not take a proper note of it. Once any material or any object is been replaced from the place where the crime has been committed it can't be stored exactly in the same place and the chance becomes less for finding appropriate evidence. The scene once touched, altered or changed will make the task hardle for the investigators to investigate but there will be again reconstruction of crime scene to identify the criminal and physical evidence, very difficult but not impossible.

Recording of Crime Scene

After taking an immediate action to protect the crime scene, the investigator should then proceed to record the evidence. But before doing, he should take help from two reliable independent witness who can give proper incident of the crime. It can be either nearby neighbors, family members or friends as their presence will act as a witness statement and strengthen the case of the prosecution at the time of trial. No evidence should be picked up or touched or even disturbed till it has been minutely described in a notebook, as its location shown in the sketch graph and photographs taken [8].

Processing of Crime Scene

1. A Lane or Strip Searches are accomplished by the searchers walking in parallel along defined lanes in the same directions. The whole area to be searched is blocked into a rectangle and four searchers proceed along tracks parallel to one side of the rectangle looking for clues [9]. With every clue discovered the searchers inform the leader who arranges for proper collection and preservation of clues [10]. The process continues until the searchers cover the entire crime scene area. The search must be cautious, slow and steady that no physical evidence is been missed (Figure 1).

2. A Grid is a lane search that is conducted by completing a lane search in one direction and then completing a lane search in a perpendicular direction. While it takes twice as long as a lane searches,

it provides a more thorough search of an area (Figure 2).

3. A Search Zone involves dividing the area to be searched into adjacent zones [11]. The smaller the size of the zone, the more methodical the search can be [12]. Zone searches may be done by multiple searches per zone (Figure 3) [13].

4. A Spiral Search involves spiral into (inward) or out from (outward) a crime scene. A practical disadvantage with outward spiral searches is the evidence may be destroyed as the searchers move to the center of the crime scene area to begin their outward search. Then they repeat the process several ties depending on the size of the circle (Figure 4).

i. If the crime scene is committed in the indoor, the investigator must be careful, thorough and systematic in his search for traces. He must make keen observations and proceed methodically by searching along the line of approach and departure as also on the scene of crime itself. Search in a room or other enclosed place like railway compartment or a vehicle should be conducted in a definite order.

ii. If the crime scene has been committed outdoor, it will be convenient to employ a team of officers and distribute the area amongst them. Such a team may consist of the leader and four members who were been trained in searching of clues for crime scene investigation.

Reconstruction of Crime Scene

Crime Reconstruction or Crime Scene Reconstruction is the forensic science discipline in which one gains “explicit knowledge of the series of events that surround the commission of a crime using seductive and inductive reasoning, physical evidence, scientific methods and their interrelationships [14]. The Association for Crime Scene Reconstruction was formed in the year 1991 by a group of crime scene professionals who “saw a need for an organization that would encompass an understanding of the whole crime scene and the necessity of reconstruction that scene in order to better understand the elements of the crime and to recognize and preserve evidence. Crime Scene reconstruction has been described as putting together a jigsaw puzzle but doing so without access to the box-top; the analyst does not know what the picture is supposed to look like [15]. Further, not all of the pieces are likely to be present, so there will be holes in the picture. However, if enough pieces of a puzzle are assembled in correct order, the picture becomes quite enough that the viewer is able to recognize the image and answer the critical questions about it.

In Forensic Science, there are three areas of importance in finding the answers and determining the components of a crime scene [16]:

1. Specific Incident Reconstruction;
2. Event Reconstruction;
3. Physical Evidence Reconstruction.

Homicide; Suicide

Forensic Science mobile unit in Rajasthan routinely visited various “Scene of Occurrence” to assist the investigating agencies to collect and preserve the clue materials left by the culprit at the spot for laboratory examination. But sometimes forensic experts helps through examination of spot, reconstruction of the same and another

aspect to find out the actual truth behind the crime scene. The spot examination dealt with the question of I.O. that whether the matter is related to suicide or a homicidal attempt.

The Crime scene usually includes line of approach, point of entry, the actual scene, and the point of exit and the line of departure. The Physical Evidence from any of these sources will be an excellent piece of evidence, as provided in SECTION 157 of the CODE OF CRIMINAL PROCEDURE, 1973 the investigating officer has to proceed to the spot to investigate all the facts and circumstances of the case. The crime scene is a potent source of diverse types of physical evidence that can lead to successful detection of a case.

Meaning and Sources of Physical Evidence

The evidence in general is anything that tends to prove or disprove a point under investigation or consideration. Physical Evidence is an evidence having a physical or material quality—a tangible article, no matter whether microscopic or macroscopic. It encompasses all the objects, living or inanimate, solid, liquid or gas. Physical Evidence is the most valuable possession of investigator in pursuing a successful and fruitful investigation. It can establish the actual crime scene that has been committed or can provide a link between the crime and the victim.

Sources

The Physical Evidence can be obtained from the three basic sources-

1. The Scene of the crime;
2. The Victim;
3. The suspect and his environment.

The crime against property will usually involve only (1) or (3) from the sources mentioned above whereas, crime against a person will attract all the three sources.

Conclusion

One can understand the significance of Locard's principle of exchange where it has stated, "Whenever two entities come in contact, mutual exchange of traces takes place" there is something left behind regardless of its minutiae and it is up to the criminality to find it [17]. The victim can no longer speak about what happened to them but the evidence left behind by the criminal gives a full drawback of

the full crime scene. While Crime Scene investigation is of the value when reconstruction is started at the scene during the initial phases of investigation, during the investigation and during the adjudication process. The Forensic Expert, may determine while the interviews are been conducted to find out the criminal. By knowing the events as reconstructed, the I.O conducting the interviews may be able to detect deception or Crime Scene Reconstruction inconsistencies as reported by Forensic Experts. The use of this knowledge can be a powerful tool in the hands of an experienced investigator [18-20].

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