FORENSIC EVIDENCE

Collection, Preservation & Storage

(Standard Guidelines for Investigating Officers and Medical Professionals)

DIRECTORATE OF FORENSICS SERVICES
HIMACHAL PRADESH
https://himachal.nic.in/forensics

MOTTO

विज्ञानेन सत्यान्वेषणम्

'Vigyanen Satya Anveshnnam'

विज्ञान से सत्य की खोज

To dig out truth through science.

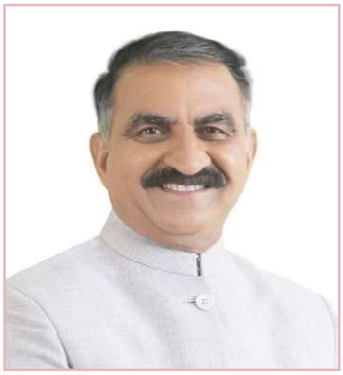
MISSION

Foremost mission of the HPFSL is to serve the society in a holistic manner by way of providing quality and timely reports in criminal and civil cases and in matters of public interest; create a vibrant and intellectual environment in the institution built on trust, commitment to promote good practices and inculcate ethical values and employ modern methods; empowerment of law enforcement agencies, judiciary and enquiry commissions with forensics knowledge for proper investigation and for better understanding, evaluation and appreciation of reports. HPFSL has to emerge as a temple of knowledge sharing with other institutions in the development of the state-of-the art forensics in order to open new vistas.

सुखविन्द्र सिंह सुक्खू
SUKHVINDER SINGH SUKHU

मुख्य मन्त्री
हिमाचल प्रदेश
CHIEF MINISTER
HIMACHAL PRADESH

Message



I am delighted to know that the Directorate of Forensic Services (DFS), Himachal Pradesh is bringing out a booklet on *'Guidelines for Collection, Preservation and Storage of Forensics Evidences for Scene of Crime Investigators & Medical Officers'*. This initiative is a significant step towards strengthening of law enforcement agencies and ensuring the effective delivery of justice.

Forensic science plays a pivotal role in uncovering the truth through scientific evaluation of forensic evidences in civil, criminal, regulatory and statutory cases. Its proper application aids justice delivery system by identifying offenders and exonerating the innocents.

I extend my best wishes to the Directorate of Forensics Services, Himachal Pradesh for this commendable effort. I am confident that these guidelines will equip the scene of crime officers and medical officers with the necessary knowledge to handle forensic evidence with precision and care. By ensuring the proper collection, preservation and storage of evidence, this resource will undoubtedly contribute to more accurate forensic analysis and ultimately, the fair administration of justice.

I wish DFS continued success in its endeavors to uphold truth and justice in the State.

(Sukhvinder Singh Sukhu)

Prabodh Saxena, IAS
Chief Secretary to the
Government of Himachal Pradesh

Ellerslie,
Shimla-171 002

Message

It gives me immense pleasure to learn that the Directorate of Forensic Services, Himachal Pradesh, has taken a significant step forward by introducing guidelines for stakeholders on the **"Collection, Preservation, and Storage of Forensic Evidences at the Scene of Crime"** to establish the corpus delicti. With the implementation of the new criminal laws of 2024, the role of forensic science has grown exponentially.

The forensic plays a pivotal role in supporting law enforcement agencies by providing precise, objective analyses of evidences, thereby accelerating investigations and strengthening prosecutions. Modern forensic tools and techniques possess immense potential to extract critical information from both physical and digital evidence left behind by the perpetrators. Such insights are invaluable in reconstructing crime scenes, identifying those involved, exonerating innocents and addressing emerging challenges in crime detection. This initiative not only enhances investigation efficacy but also reinforces the broader administration of justice.

I extend my appreciation to the Directorate of Forensic Services for this proactive endeavor and wish them continued success in their pursuit of excellence in forensic science.

(Prabodh Saxena)

Kamlesh Kumar Pant
IAS

ADDL. CHIEF SECRETARY (HOME)
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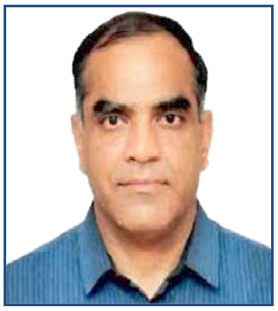
Message



I am pleased to learn that the Directorate of Forensics Services, Himachal Pradesh is bringing out Guidelines on Collection, Preservation and Storage of Forensic Evidence for Scene of Crime Investigators and Medical Officers.

In the modern era forensic evidence serves as a cornerstone for effective criminal justice system. The credibility and admissibility of forensic evidence in courts depend significantly on its collection, preservation and storage. Compromising these early steps may lead to unreliable forensic results and obstruct justice. Also, the enactment of the three new criminal laws viz. BNS, BNSS and BSA in the country has further elevated the role of forensic science by mandating greater reliance on scientific and technical evidence in investigations and trials. The formulation of these guidelines is a timely and commendable step towards standardizing forensic evidence handling procedures across the state.

I am confident that this initiative will play a vital role in closing procedural gaps, fostering better collaboration between different investigating agencies and forensic experts and promoting the scientific handling of forensic evidence, thereby strengthening the criminal justice system.

(Kamlesh Kant Pant, IAS)
Additional Chief Secretary (Home) to the
Govt. of Himachal Pradesh

Preface

Honoring the Past, Shaping the Future

"Science Gathers Knowledge Faster than People Gather Wisdom"

- Isaac Asimov

An era of the use of science in the investigation of crime began with the commencement of the first Chemical Examiner's Laboratory in the mid-nineteenth century, more precisely in 1849 in Madras (now Chennai) for Southern India, followed by Kolkata (1853) for Eastern India Agra (1864) for Northern India and Bombay (1870) for Western India to cater to the needs of investigation agencies for the testing of poison and blood stains across the country in Indian scenario. By the turn of the 19th century, the first Police Commissioner's (1902-1903) report envisioned the use of a fingerprint system, which initiated the process of establishing scientific units in Police Departments. The First Forensic Science Laboratory came into existence in the year 1952 in Kolkata (West Bengal), followed by many other states in the subsequent decades, and in HP, the State FSL was established in 1988. With the advancements in tools and techniques, the role of forensic experts, who were working within the four walls of lab also got transformed from 'Lab to Field' for proper identification, collection and preservation of forensic evidence which was a key to success for the analysis of clues in the lab by the nineteen sixties-seventies of the last century as and when requested by the police.

The Supreme Court of India, in the case of State of UP v/s Dharam Deo Yadav (2014), also mentioned that the crime scene must be handled scientifically without any error. Many times, reliable, trustworthy, credible witnesses to the crime seldom come forward to depose before the court, and even hardened criminals get away from the clutches of the law. The investigating agency has to look for other ways and means to improve the quality of investigation, and that can only be achieved through the collection of scientific evidence. Emerging new types of crimes and their level of sophistication, the traditional methods and tools have become outdated. Hence, there is a necessity to strengthen Forensic Science for crime detection.

The implementation of three new laws (Bhartiya Nagrik Suraksha Sanhita, Bhartiya Nyaya Sanhita, and Bhartiya Shakshya Adhiniyam 2023) w.e.f. 01.07.2024 and the mandatory provision of forensic intervention in all crimes entailing punishments of seven years or more has necessitated to design Standard Operating Procedure (SOP) for proper sampling, collection and preservation of forensic evidence.

Further, over a period of time, forensics has evolved greatly. The new specialties have been introduced with their protocols for collection and preservation of forensic evidence which warrant guidelines for preservation and collection of evidences from scene of crime, corpse etc. With the initiative of the department to frame guidelines for the collection, preservation, and storage of forensic evidence and their implementation by end users is bound to help in the dispensation of justice in the times ahead.

Dr. Meenakshi Mahajan
Director Forensics

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Chapter 1
Background

With a commitment to provide high-quality scientific services to the Justice Delivery System, the Directorate of Forensics Services, Himachal Pradesh, has been offering forensics services for over three and a half decades. These services have primarily been provided to state investigation agencies and central investigation agencies, including the Central Bureau of Investigation, National Investigation Agency, and Enforcement Directorate, GoI, in matters of public interest as needed, serving as an aid to investigations in the administration of justice.

The forensics set-ups in the state had noted that, at times, the quality of many exhibits submitted for undertaking analysis did not meet the minimum acceptable standards, resulting in the loss of forensic evidence and wastage of precious resources, which leads to miscarriage of justice. Further, the two very challenging areas in the Criminal Justice System across the globe are ***'Crime Scene Management'*** and ***'Quality Control'***.

To improve the quality of the exhibits received, and scientific results thereof, the Directorate of Forensics Services (DFS), HP is bringing out General Guidelines to assist two prominent pillars in the Indian Criminal Justice System i.e. Adjudication and Enforcement Agencies. These guidelines will also serve medical practitioners in better management of evidence from corpse/victim/suspect, and maintaining the integrity of samples through proper collection, preservation, packaging, and subsequent submission for scientific analysis. The DFS, HP has worked on preparing the guidelines to meet the requirements of the Law of Land.

Introduction

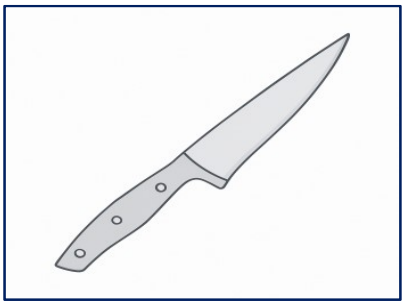
The guidelines have been developed to provide guidance and standardize procedures for the safe and effective collection, preservation, packaging, and transportation of forensic exhibits. To obtain accurate and reliable results from a forensic laboratory, it is imperative to maintain the integrity via an unbroken chain of custody for every piece of evidence. The successful investigation and prosecution of crime depends on adhering to high standards in the precise collection, preservation, and scientific evaluation of evidence.

Exhibits constitute a crucial part of the evidence utilized during investigation and subsequent trial. Their integrity is subject to examination in court; therefore, maintaining a clear chain of custody and proper management is essential to withstand legal scrutiny.

The guidelines envisage five types of evidence encountered by the Investigation team, which are defined as below:

1. **Personal Evidence**- It refers to a third-party witness. The witness makes a statement or declares a fact, either oral or written. The witness swears by his/her statement or oral submission for its authenticity. Testimony from a person at the crime scene is subjective and can be influenced by extraneous considerations.

2. **Physical Evidence-** Any material, either in visible form or in trace quantities that can be established through scientific examination and analysis, the same is a part of the crime. This evidence includes Fingerprints, Blood, Fiber, Hair, Footprints, Glass, tool marks etc.



3. **Digital Evidence–**The evidence is not available in physical form, but is a kind of document available in a digital form. Digital footprints left by the perpetrator with the service providers (CDR, IPDR), intermediaries (social media app providers), electronic gadgets (mobile phone, computer, iPad, body-worn cameras, voice recorders etc.) are some of the examples.

4. **Miscellaneous Evidence -** These are physiological indicators, also known as pseudo-scientific evidence, expressed in graphical format by the instruments like the Polygraph (lie-detector), Layered Voice Analysis (LVA), Brain Electrical Oscillation Signature (BEOS) etc.

5. **Corpus Delicti Evidence-** Evidence that a crime has been committed. Before an investigation can begin, there must be proof that a crime has occurred, e.g., a dead body, broken window, stolen safe, etc.

In serious crime cases, the collection of forensic evidence is mandatory to enhance investigation quality and boost the conviction rate. Currently, the practices for evidence collection vary across states. At present, in many states, the scientific staff from Forensic Science Laboratories (FSLs) or District/Mobile Forensic Science Units (DFSU/MFSU) are entrusted with the task of collection of evidence, apart from the police officers, depending on the nature of the case.

The enactment of three New Criminal Laws w.e.f. 1.7.2024, more precisely clause 176(3) of BNSS, made a pivotal shift in crime scene management, addressing the long-standing gap in statutory requirements. By mandating expert's involvement in serious crime cases for the collection of forensic evidence, it seeks to improve evidence quality and support stronger prosecution outcomes. However, practical implementation remains complex, as both police investigators and forensic experts currently share the responsibility of evidence collection. To address this, Himachal Pradesh is now positioned to develop standardized protocols that align with national reforms. These guidelines will serve not only crime scene units and investigating officers but also to medical practitioners and other stakeholders critical to the Justice Delivery System, ensuring a cohesive and coordinated approach to forensic evidence handling.

The investigator(s) visiting a crime scene may sometimes encounter unexpected evidence, like body traps containing chemical/biological weapons, improvised explosive devices (IEDs), or any other trace evidence like pollens, soil, hair strands, etc. Theymust ensure that, due to their ignorance, there is minimal impact at the crime scene

Please remember the quote: -

> ***"Whenever someone enters or exits an environment, something physical is added to and removed from the scene"-*** *Sir Edmond Locard, French Criminologist.*

It is herein recommended, as a best practice, that the scene of the crime be immediately processed and forensic evidence dispatched to the laboratory to avoid degradation as well as any other unfavorable incident. Furthermore, it is recommended that submission of the exhibits to different forensics set-ups in the state must be without delay and/ or within the stipulated time frame wherever applicable, with due consideration to the integrity and deterioration rate because of improper storage, and atmospheric conditions, to mention but a few.

The goal of crime scene investigation is to identify, document, and handle evidence at the scene of the crime. The success of crime scene investigation depends on the proper piecing together of the evidence to form a picture of what has happened at the crime scene.

The guidelines further serve as a check list of what the SOC investigation teams, IOs, and medical practitioners should consider while handling criminal cases. These will also serve as a basis for rejection of crime exhibits by respective SFSL and RFSLs if they do not meet the minimum requirements.

The handling of Forensic exhibits using the guidelines will help in adhering to professional ethics, thereby securing the integrity of Forensic evidence.

Target Group

The guidelines are intended for, but not limited to, all persons who gather evidence during investigation, enforcement, and inspection, as well as other persons involved in the administration of justice to make informed decisions.

Chapter 2

Crime Scene Management

The institution of investigators, like police or forensic scientists, needs to have a crime scene kit with all sorts of accessories. A probable list of items required is as follows:

- **Stationery for Documentation**
    - White papers
    - Pencil with sharpener, eraser
    - Ballpoint pen
    - Permanent markers
    - Paper tags
    - Notepad
    - Laptop
    - Power Bank / Portable Charger
- **Initial Scene Security**
    - Ribbon for the protection of a crime scene
    - Placard (for scene marking)
    - Voice Recorder (for initial observations)
    - GPS Device / Mobile GPS App
    - Weather Protection Gear (Plastic Sheet, Raincoat, Umbrella)
- **Personal Protection & Safety**
    - Skull cap & shoe cap
    - Hand gloves
    - Face mask
    - Protective eyeglasses
    - First Aid kit
    - Hand wash & towel
    - Blast-protective gear (helmets, heat-resistant gloves, gum boots)
    - Anti-static mats, bands, and bags
    - Disinfectant Spray / Wipes (DNA-safe)
    - Chemical Spillage Kit
    - Waste Disposal Bags (Biohazard & General)

- **Scene Documentation**
    - Digital camera with video recording facility
    - Portable Document Scanner or Mobile Scanning App
    - Forensic Light Source Kit (ALS)
    - Scene Sketch Templates or Stencils
    - Compass
    - Digital Thermometer / Hygrometer
    - Laser distance meter
    - Digital calliper
    - Micrometer

- **Scene Search & Evidence Collection:**
    - Flashlight with extra batteries
    - Magnifying glass
    - A handheld small vacuum cleaner
    - Electrostatic Dust Print Lifter
    - Gel Lifters or Adhesive Lifting Tape
    - Gunshot residue kit
    - Sexual assault & blood detection kits
    - Drug Test Kit
    - Explosive Kit
    - Footwear & tire casting materials
    - Dust Lifting kit
    - Sterile Swabs
    - Rubber rollers, inking slabs
    - DNA-Free Sampling Tubes
    - Blood Collection Tubes (e.g., EDTA tubes)
    - Ear buds
    - Distilled water ampoule
    - Phosphate buffer, alcohol, saline
    - Glass Slides & Cover slips
    - Gauze cloth / Whatman filter paper
    - Tracing paper

- **Tools for Collection & Processing**
    - Scissor (both small & big), razor/surgical blades
    - Forceps, tweezers (non-metallic preferred for trace), Scalpel
    - Pen knife (Small & medium)
    - Screwdriver kit
    - Measuring tape
    - Spatulas, scoops, scrapers
    - Syringe
    - Brush
    - Soft-tipped tweezers for handling documents

- **Evidence Packing Material:**
    - Small containers (plastic/glass) / boxes of various sizes
    - Self-sealing plastic pouches
    - Cloth-lined paper bags, envelopes of different sizes
    - Glass vials
    - Screw-top containers
    - Rigid boxes
    - Anti-static Faraday bags
    - CD mailer envelopes
    - Leak-proof jars with preservatives
    - Ice packs/cold boxes
    - Moisture-absorbing packets
    - Waterproof evidence bags
    - Biohazard bags
    - Aluminium foil
    - Plastic folders & Plastic sleeves
    - Evidence Pre-printed Labels
    - Paper tag for identification (with police station, FIR No., date, etc.)
    - Sealing wax, candle, and matchbox
    - Evidence seals / tape

Note: The above items shall be exclusively carried by the SOC officers in a separate investigating kit. The items relating to the search and lifting of fingerprints viz. Fingerprint Brushes and Powders (Black, White, Magnetic, and Fluorescent) shall be brought by the fingerprint expert, who should be called to all scenes of crimes, except simple investigation cases.

a) **Protection for Investigators**: The crime scene investigators/forensic scientists are required to be use safety protective measures before proceeding with the crime scene investigation. Investigator(s) having health issues and weak psychological strength should be avoided, as this may sometimes cause an unpleasant situation during inspection. The general rules for any person involved in the collection, preservation, packaging, and submission of forensic exhibits should be observed at all times to protect him/herself from contracting diseases and other health-related conditions. The following are some of the essentials that need to be taken care of:

i) Vaccination against hepatitis B and tetanus is a must for all before handling crime scene materials.

ii) Always use personal protective equipment (PPE) such as disposable gloves, headgear and lab coats, gum boots, ear muffs, nose masks, etc.

b) Dos and Don'ts: The objective of crime scene management is to lift credible evidence from the area of occurrence as well as from places/persons linked to the specific incident. It requires awarding an identifying mark to each item collected, and its documentation, including its relative location w.r.t. a fixed mark. However, the scene of the crime should be attended to as soon as possible, as every passing minute may dilute the evidential value of the material(s).

i. Investigating officer (I.O.) along with his/her team members to reach the place of occurrence immediately after receiving intimation of an incident, and must carry a crime scene kit.

ii. The services of Forensic Expert and Medical Officer be requisitioned in writing as per the legal requirement for inspection of the crime scene.

iii. Smoking, eating, or drinking around potential evidence/exhibits is prohibited.

iv. Telecommunication during the evidence collection process should be strictly limited to operational matters.

v. Coughing, sneezing, or spitting around potential evidence/exhibits must be avoided. Investigators who are feeling unwell or have a need to do the above must be excused from the processing of the crime scene.

vi. Do an overall survey of the crime scene.

vii. Boundaries of the crime scene to be evaluated.

viii. After reaching the scene of crime, the place of occurrence shall be guarded/ cordoned with ribbon as soon as possible to prevent the entry of unauthorized personnel, and shall remain so till the completion of the inspection.

ix. The minimum number of authorized persons should be allowed to enter the crime scene for the collection of evidence. Prepare a log of all persons entering and exiting the scene.

x. Crime scene investigators to wear protective gear to avoid any contamination.

xi. The injured person, if any, be given immediate medical aid by shifting to the nearby hospital to save life. The I.O should identify the injured as well as any deceased and injuries, if any, inflicted upon them.

xii. The shifting of the body of the deceased, if any, after marking the location of the body for the autopsy purpose.

xiii. The sketching of the place of occurrence as well as photography (both digital & video) of the same from all the angles.

xiv. Take all available precautions to preserve the evidence

xv. The objects present at the place of occurrence, having possible evidential value, should be uniquely marked, photographed, and documented in situ before collection.

xvi. The evidence should be lifted from the scene of the crime using appropriate tools (forceps, swabs, lifters)by police personnel/ Forensic experts in consultation with each other and be stored in recommended containers. All the processes in compliance with Section 105 of BNSS shall be recorded through videography.

xvii. For trace evidence (hair, fibers, glass, soil), use tools such as forceps, sticky tapes, or vacuum devices and place samples into paper bindles or glass vials before sealing.

xviii. When handling digital evidence (e.g., mobile phones, hard drives), ensure mobile devices/hard disks are placed in faraday bags to isolate them from the network, and hard disks in anti-static material.

xix. Avoid environmental degradation of evidence (e.g., DNA, biological fluids, trace materials) by keeping exhibits away from direct sunlight, moisture, and fluctuating temperatures during collection and transportation.

xx. All exhibits requiring Latent Prints or Touch DNA testing, a pre-submission inspection should be performed in a designated clean area before submission to the forensic laboratory.

xxi. Air-dry wet items before packaging to prevent mold.

xxii. Any suspected vehicle linked to crime needs to be inspected for any possible unusual scratches/ damages or biological stains. In case of any vehicular accidents, the I.O. should take the signature of the accused on the notice u/s 133 MV Act to ensure that he was driving the vehicle at the time of the incident.

xxiii. All the CCTV cameras surrounding the place of occurrence need to be checked (Note time in the CCTV footage w.r.t actual time), and make a clone ofthe hard disk. The hash value should be generated for each hard disk and shall be recorded & mentioned in the seizure memo as well as in the certificate 63(4) Part-A schedule of BSA. During inspection, if cloning is not possible, the DVR should be sealed in a tamper-proof manner.

xxiv. Always place the evidence in a clean, dry, and previously unused inner container.

xxv. Use paper bags for biological evidence, plastic containers for solids, and glass containers for liquids.

xxvi. Seal the inner container with tamper-evident or filament tape.

xxvii. All transportation of suspected or confirmed hazardous material must comply with the applicable regulations.

xxviii. Affix appropriate labels such as **"EVIDENCE," "BIOHAZARD," or "LATENT PRINT"** to the inner container based on the nature of the evidence.

xxix. Place the sealed inner package in a clean, dry, and unused clean outer packaging material. The outer packaging material should be sealed with tamper-proof tape so that tampering with the container would be evident.

xxx. Each item of evidence must be wrapped, packaged, and sealed separately to prevent cross-contamination.

xxxi. Label each package with case number, FIR, item description, collector's name, and date/time.

xxxii. Prepare seizure memo for all the collected evidential materials.

xxxiii. Good personal hygiene must be observed. The hands should be washed thoroughly after the removal of protective gloves, even if the gloves are not cut or punctured.

xxxiv. Collection of the Medico Legal Certificate (MLC) of the injured person admitted in the hospital from the attending physician in a sealed envelope to maintain integrity.

xxxv. Maintain a comprehensive Chain of Custody Log, noting each handler’s name, date, time, and purpose of transfer for every movement of the exhibit, from scene to storage and to lab.

xxxvi. Forward the sealed samples to the Malkhana of the police department for further onward submission to the Forensic Science Laboratory (FSL) as soon as possible for forensic testing.

xxxvii. I.O shall ensure proper affixation of the sample seal on the requisite form and get a road certificate (RC) issued from Malkhana, addressed to FSL.

xxxviii. While submitting the exhibits to the forensic laboratory, enclose duly signed and stamped seizure memos, copies of FIR, Medico-Legal Reports, Post-Mortem report, specimen seals, etc, along with the docket.

xxxix. Verify seals and labels before dispatch.

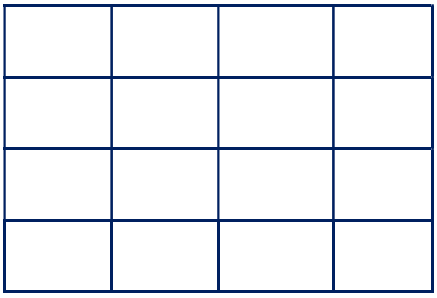
xl. Mention all previous case-identification numbers, evidence submissions, and communications related to the case, if any.

xli. Retain one copy of documentation at the collection site.

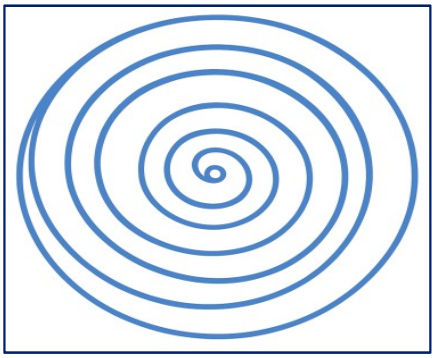
xlii. I.O. should note down the statement of the eyewitness, if any.

c) **Inspection of the crime scene:** The investigating officer must adopt an orderly process to assess the crime scene so that no material evidence is left out. There are common search methods where some are useful for open areas, while others are useful for closed areas.

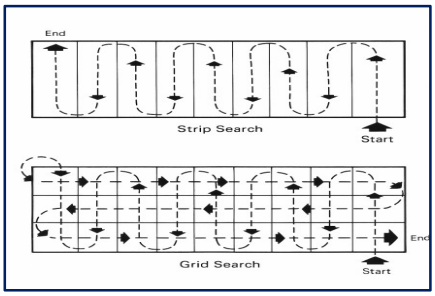
Zone search: In the zone search method, the area to be searched is divided into unit zones, and each unit is then processed individually as a separate crime scene. This method is mostly adopted for a closed area.



Spiral Search- In a spiral search, a clockwise circle begins at the main impact point of the scene (i.e., the body), and the searcher circles around that point at an ever-increasing radius. This method is useful in open areas.

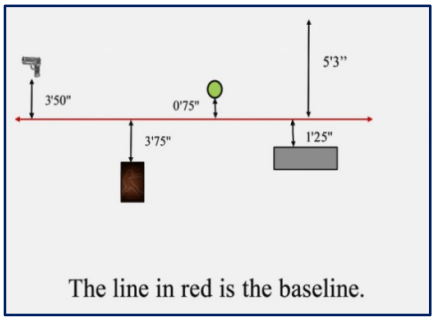


Strip/Grid search- This type of search is done when the area of the crime scene is located outdoors for example football field. The crime scene is divided into convenient strips, and each strip is examined carefully one by one.



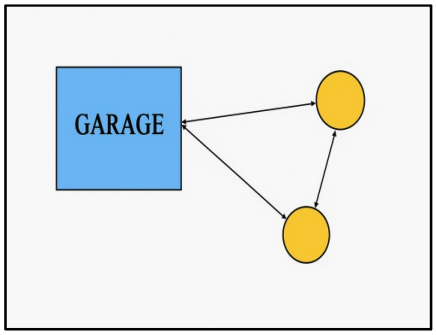
d) **Mapping of a crime scene**: These processes are done for any future possibility of reconstruction of the SOC.

Baseline Mapping: In this method, a baseline is developed or identified from which to conduct measurements. The baseline can be the edge of a roadway, a wall, or a fence, or can be improvised by placing a string or a tape measure through the scene and measurements of the distance of different objects are made from there. Once a baseline is established, measurements are taken from it at an approx. 90^0anglefrom the baseline to a point of the item. However, the method is prone to error.



Triangular Mapping: This process is required for future reconstruction of a crime scene. The two fixed points are chosen that are fixed and permanent. From these two fixed points, a minimum of two measurements are taken to specified points on an item or within the crime scene.

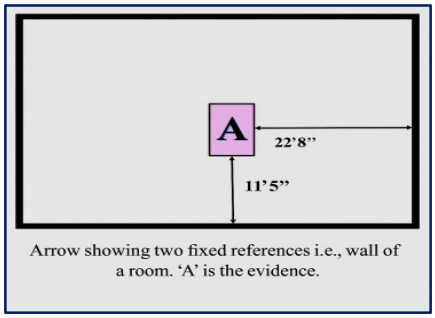
If the object has a fixed or a constant shape (e.g., a firearm or item of furniture), the object is measured at two points, from two separate sets of fixed points, for a total of four measurements.



If the object has a variable shape or size (e.g.,

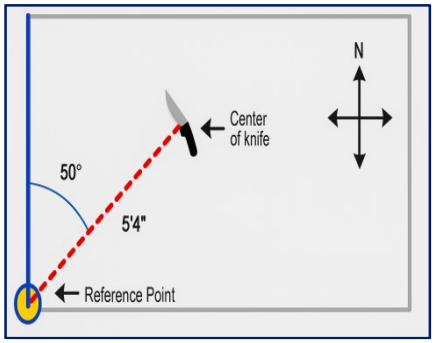
a pool of water or blood or a pile of clothes), the object is measured to an approximate centre of mass.

Rectangular Coordinate Mapping: In this method, two measurements are taken to a point on an item or location at the scene, one from each identified baseline, as shown in the picture. This method is beneficial in confined spaces and smaller interior scenes.



Arrow showing two fixed references i.e., wall of a room. 'A' is the evidence.

Polar/Grid Coordinate Mapping- In this method, polar coordinates are used to locate evidence (Plane crash in a forest or in mountainous terrain) at a crime scene. A polar coordinate is a two-dimensional coordinate system in which each point on a surface is identified by a distance from a reference point and an angle from the reference direction. This is a two-dimensional system that indicates the location of an object by providing the angle and distance from a fixed or known point. To conduct measurements, a transit or compass is necessary to measure the angles and polar directions, suitable for big outdoor scenes with few landmarks.

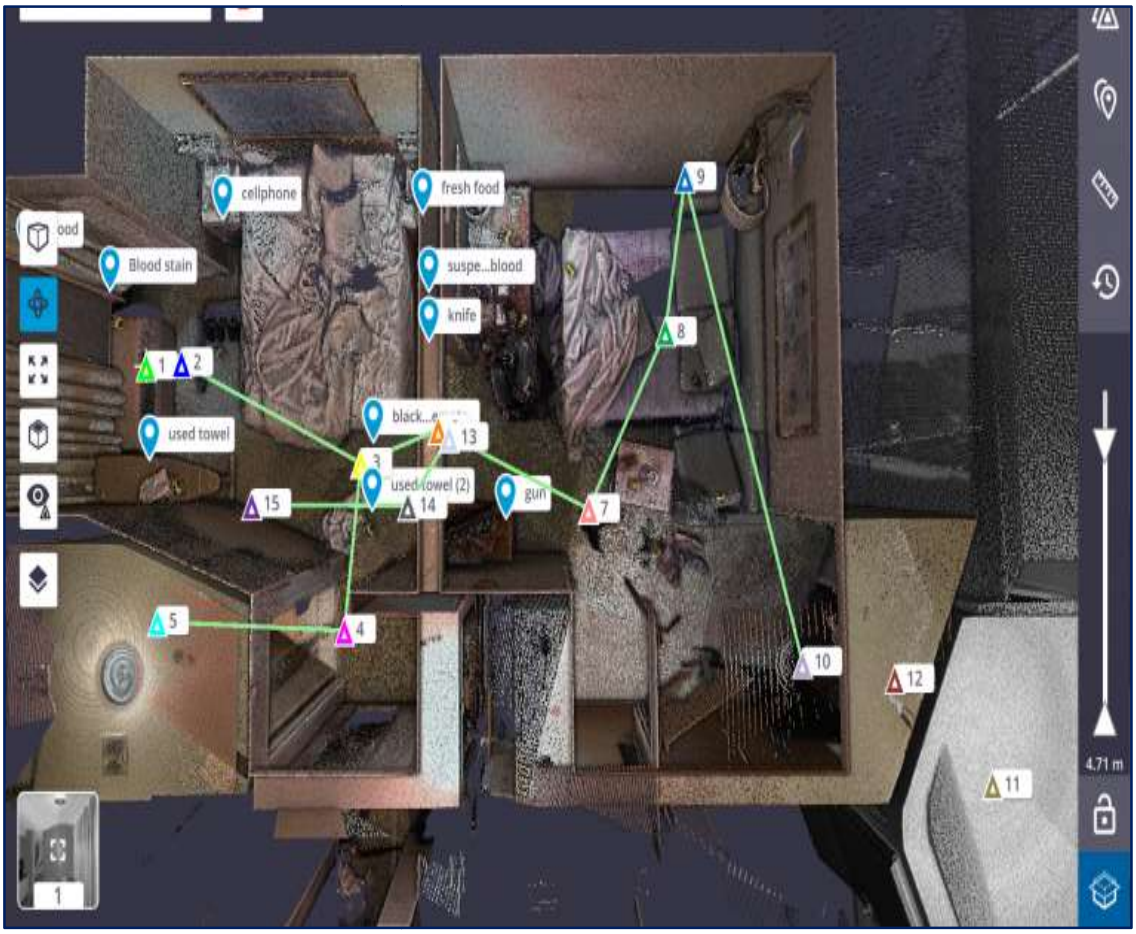


Other advanced mapping systems are:

(1) Global Positioning System (GPS): It is a satellite-based navigation system comprising a set of 24 satellites placed in Earth's orbit by the US defense establishment. A GPS receiver needs three satellites for a 2D position and four satellites to work out for 3D position. This is sufficiently accurate for large scenes of occurrence, like to trace out wreckages from bulky bodies like ships, aeroplanes, etc.

(2) Total Station: It is an electronic surveying instrument that has an integrated computer & can measure angles in the horizontal and vertical planes, utilizing a laser range finder instead of the more archaic method of a manual tape measure. This is especially useful because elevation changes are difficult to measure and depict in a crime scene sketch. The total station is capable of recording evidence positions in three dimensions, thus simplifying the otherwise complicated situation.

(3) 3D Recorder: 3D Crime scene recorders are used to take a panoramic view of the crime scene in modern times. 3D scanners capture the crime scene with high precision, documenting even minute details that the human eye or traditional methods may miss.3D scan creates a permanent digital replica, preserving it exactly as it was, and can be used for future study as well as in cases of reconstruction of the crime scene. This technique is more effective and accurate, but costly.



Mapping of the Scene of Crime with 3D Crime Scene Scanner

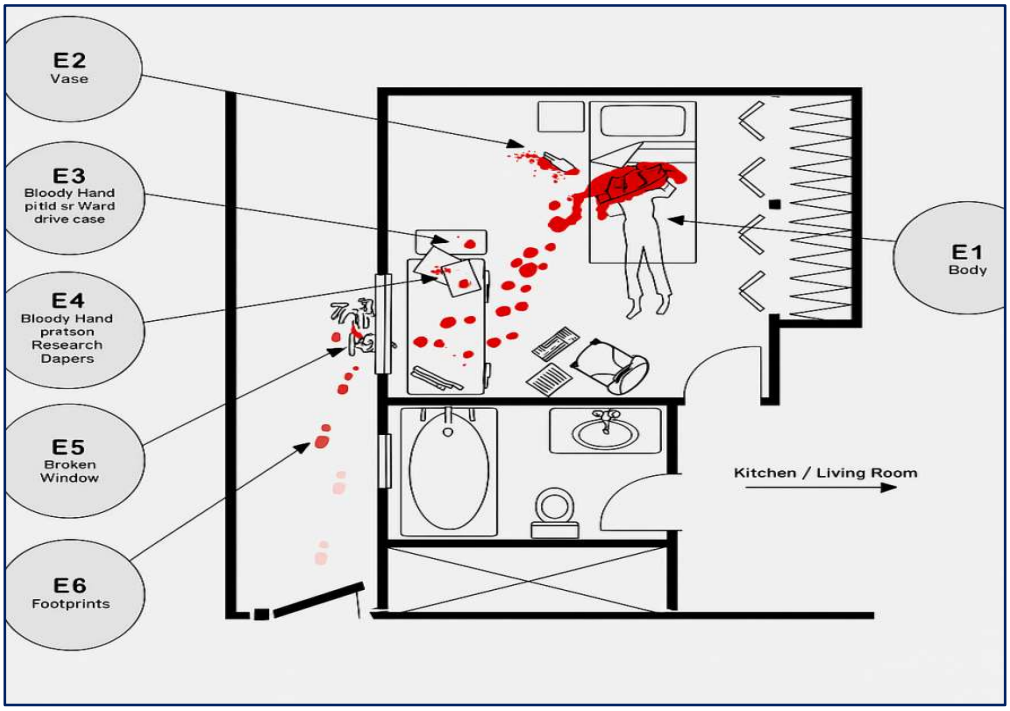
Crime Scene Reconstruction:

To understand the chronology of past events, the crime scene reconstruction is carried out to discover the truth:

1. **Reconstruction:** The reconstruction is based on piecing together the evidence and analysis to provide a plausible explanation of the event. The reconstruction should be based on scientific principles and evidence, not speculation. A successful reconstruction requires an iterative approach—refining hypotheses as new information emerges or inconsistencies are identified. The conclusion must be supported by a thorough evaluation of all relevant data and clearly distinguish between what is known, what is inferred, and what remains uncertain. Equally important is the effective communication of findings: the results should be presented concisely, unambiguously, and accurately, using appropriate terminology and supported by evidence, to ensure that they are understandable.

2. **Re-enactment:** Refers to having the victim, suspect, witness, or other individuals re-enact the event or the physical evidence based on their knowledge of the crime.

3. **Re-creation:** Refers to replacing the necessary items or actions of the crime scene through original scene documentation.



A View of Crime Scene Reconstruction

Chapter 3

Handling of Biological Evidence

(Blood, Semen, Saliva, Bone, Tissue, Hair, etc.)

Biological evidence plays a critical role in the investigation and prosecution of various criminal offenses, including homicide, rape, sexual assault, kidnapping, involuntary manslaughter, vehicular homicide, and wildlife-related crimes involving flora and fauna. It is also instrumental in determining the cause and circumstances of death in cases of ante-mortem and post-mortem drowning.

Forensic examination of biological evidence involves comparison with control samples of known origin. The primary objective is to identify the nature of the biological material and, through DNA profiling, establish a link between the evidence and a specific individual—either a victim or a suspect-or to a particular location or crime scene. DNA analysis can thus be pivotal in establishing associations between the victim, the suspect, and the scene of the crime.

Biological Evidence

This section provides comprehensive guidelines for the proper collection, preservation, packaging, and submission of suspected crime scene exhibits intended for biological analysis and DNA profiling. It also outlines the protocols that must be followed by scene of crime investigators and medical officers while handling forensic evidence for DNA profiling. Adherence to these protocols ensures the integrity of the evidence and the reliability of the forensic conclusions drawn.

Caution:

Biological fluids and stains collected from crime scenes may harbor dangerous pathogens such as Hepatitis B virus (HBV), Human Immunodeficiency Virus (HIV), and Mycobacterium tuberculosis, among others. These pathogens pose significant health risks to forensic personnel, crime scene investigators, and medical professionals. Therefore, strict bio-safety measures must be followed during the collection, preservation, storage, transportation and analysis of biological evidence.

Packing of Biological Evidence

Guidelines for Biological Evidence

Evidence	Collection, Packaging, and Preservation
Weapons(s) such as sickles, darat, knives, axes, spears, sticks, iron bars, firearms, stones, etc. **(Action** : Crime Scene Investigator)	• Collect the whole item and air dry • Package in brown paper • Package sharp and heavy objects in cardboard boxes or hard paper material • Label and secure the package with evidence tape or seal • Store in a dry area at room temperature
Reference blood sample from victim(s) and /or suspects	• Collect blood from the victim and the suspect into purple top containers with preservative (EDTA vials) along with an identification form duly filled and signed by the designated authority. Seal, label, and store at 2 - 8^0C

(**Action:** Autopsy Surgeon)	• Alternatively, collect blood from the fingertip onto a sterile cotton gauze/ FTA card along with a duly filled identification form signed by the designated authority. Air dry, and store at room temperature • Package blood-stained gauze/FTA card separately in a paper envelope, and store at room temperature. • Label and secure the package with evidence tape or seal
Clothing of victim(s) and suspect(s) and the dirty linen (**Action**: Autopsy Surgeon / Crime Scene Investigator)	• Air dry each item • Package individually in a cloth or paper envelope using druggist's fold - use white paper sheets to separate each stain • Do not touch the stained part while searching for stains • Label and secure the package with evidence tape or seal • Store in a dry and cool place
High vaginal swabs- from living or dead victims **Anal/Rectal swab** **Penile swab** (**Action**: Autopsy Surgeon)	• Collect with sterile swabs from vaginal secretions, any fluids around the vagina, the anal area, and the victim's legs • Air dry the swabs (use recommended swabs) • Package swabs separately in paper envelopes • Label and secure the package with evidence tape or seal • Store in a dry and cool place
Condom(s) (**Action**: Autopsy Surgeon / Crime Scene Investigator)	• Collect the condom(s). Care should be taken to avoid the biological material from the inside of the condom from being mixed with the biological material on the outside of the condom • Package the condom in a glass tube and keep it upright. • Label and secure the package with evidence tape or seal • Store at 2–8^{0}C
Underpants of the suspect and the victim (**Action:** Autopsy Surgeon / Crime Scene Investigator)	• Air dry each item • Package individually in a cloth or paper envelope using the druggist's fold - use white paper sheets to separate each stain. • Do not touch the stained part while searching for stains. • Label and secure the package with evidence tape or seal • Store in a dry and cool place
Fingernails from both the victim and the suspect. (**Action**: Autopsy Surgeon)	• Cut/clip nails from all fingers. • Package them in a druggist's fold and paper envelope • Package fingernails from each person separately. • Label and secure the package with evidence tape or seal • Store in a dry and cool place
Beddings where a sexual assault is suspected to	• Air dry visible/wet stains • Package each item separately in a paper sheet

have taken place. (**Action**: Crime Scene Investigator)	• Label and secure the package with evidence tape or seal • Store in a dry and cool place
Stains on: 1. Large immovable objects viz. Walls, floor, sofa sets, cars) (**Action:** Crime Scene Investigator) **2.** Victim that may have been licked, kissed, or bitten**.** (**Action:** Autopsy Surgeon)	**For visible stains** **Swabbing** • Moisten a sterile swab with phosphate buffer/ normal saline solution for brown stains • Rub the stain gently so that it turns brown. Use more than one swab • Moisten a sterile swab with a minimum quantity of clean/sterile water in a suspected area like the victim's face, breast, thighs, etc., with care exercised not to dilute the stain • Air dry and package in paper bags or an envelope • Label and secure the package with evidence tape or seal • Store in a dry and cool place **Scrapping** • Scrape the stain using a sterile razor blade • Collect the scrapings on a clean piece of paper • Air dry, if wet • Package in paper bags or an envelope • Label and secure the package with evidence tape or seal • Store in a dry and cool place **For non-visible stains:** • Mark the suspected areas of contact • Collect cellular/contact material from an item using a moist sterile/saline cotton swab • Use a dry swab afterward to collect any remaining residue • Air dry moist samples • Package in a paper bag • Label and secure the package with evidence tape or seal • Store in a dry and cool place
Bite mark (**Action**: Autopsy Surgeon /Crime Scene investigator)	• Photograph the bite mark site with scale • Take a denture of the bite mark site, if feasible • Take a reference denture of a suspect • Package questioned and reference denture casts separately in a suitable container • Label and secure the package with evidence tape or seal • Store at room temperature
Buccal swabs	• Brush a buccal swab across the inner lining of each cheek • Do not collect saliva

(**Action**: Autopsy Surgeon)	• Air dry the buccal swab • Package in a paper bag • Label and secure the package with evidence tape or seal • Store at room temperature
Autopsy blood sample or other samples (**Action**: Autopsy Surgeon)	• Place blood on sterile gauze. (Never use FTA card) • Air dry the blood-stained gauze • Package gauze in a druggist fold • If autopsy blood cannot be obtained or is in poor condition, collect other body tissues such as sternum bone, femur head, deep muscle, tooth, or whole fingernails. Store in saline or 70% ethanol • Package tissue in a sterile vial • Label and secure the package with evidence tape or seal • Store at 2 - 8^0C
Body tissues (Femur head, deep muscle, tooth or whole fingernails, and other tissue), **Foetal remains, Product of Conception (PoC), Retained PoC** (**Action**: Autopsy Surgeon)	• Collect body tissues like (femur bone, deep muscle, tooth, or whole fingernails, and other bone tissue) • Preserve the muscle tissue/foetal remains in normal saline/ freshly prepared 70% solution. • **Never use formalin as a preservative** • Package tissue in a sterile vial • Label and secure the package with evidence tape or seal • Store at 2 - 8^0C
Cigarette/Bidi butts (Action: Crime Scene Investigator)	• Collect each piece separately • Package individually in paper envelopes • Label and secure the package with evidence tape or seal • Store at room temperature
Missing persons and victims of mass disasters-Mass disasters include fires, accidents, landslides, and terrorist attacks. (**Action**: Crime Scene Investigator)	• Collect reference samples from close family members (biological parents, brothers, sisters, and in some limited instances, uncles and aunts) into purple top containers with preservative (EDTA vials)along with an identification form duly filled and signed by the designated authority. Seal, label, and store at 2 - 8^0C • Alternatively, collect blood from the fingertip onto a sterile cotton gauze/ FTA card along with a duly filled identification form and signed by the designated authority. Air dry, and store at room temperature • A family tree should be drawn to obtain an accurate family structure • Package blood-stained gauze/FTA card separately in a paper envelope, and store at room temperature • Label and secure the package with evidence tape or seal
Drowning victim (**Action**: Autopsy Surgeon)	• Collect the femur /sternum bone of the victim • Do not wash

	• Air dry • Package in a paper envelope or a cloth bag • Label and secure the package with evidence tape or seal • Store at 2 - 8^0C
Reference water sample (**Action**: Crime Scene Investigator)	• Collect at least 1000 ml of water from the site of drowning in a sterilized plastic bottle • Label and secure the package with evidence tape or seal • Refrigerate or keep cool
Fiber, Feather, Hair, Wood, and Plant vegetation from the SOC, suspect, or victim (**Action**: Crime Scene Investigator)	• Collect with clean forceps • Package each item separately in a paper envelope • Label and secure the package with evidence tape or seal • Store dry at room temperature
Control samples--Feather, Hair, Wood, and Plant vegetation (**Action**: Crime Scene Investigator)	• Feather- five numbers • Hair with root-10-20 number • Control wood sample from log/stump should be 3-5 inches in thickness • Twigs, leaves/leaf fragments from the suspected area • Package separately, clearly label as control • Label and secure the package with evidence tape or seal • Store dry at room temperature
Timber samples (**Action**: Crime Scene Investigator)	• Collect the recovered timber • Collect samples from the trunk as well as the stump part of the tree. • Wrap securely in labeled paper/cardboard • Label and secure the package with evidence tape or seal • Store dry at room temperature


Collection of Biological Evidence

Chapter 4

Handling of Chemical Science Evidence

Chemical Sciences play a vital role in identifying various substances, viz. drugs, poisons in biological matrices, inflammable materials, dyes, chemicals, residues of acid, base, and the evidence left at the scene of the crime. Chemical Sciences include disciplines like Chemistry, Toxicology, and NDPS etc. The clue materials in the following cases are received for examination in chemical sciences:

Chemistry & Toxicology

- Suspected poisoning (post-mortem and ante-mortem)
- Drunken driving
- Arson and Fire
- Bribery/Trap
- Alcoholic beverages
- Hooch tragedy
- Acid-and-alkali attacks
- Adulteration in petroleum, drugs, and cosmetics products
- Drug abuse and over dosage

Narcotic Drugs and Psychotropic Substances

- Opium, poppy straw, heroin/smack/brown sugar.
- Charas, ganja, bhang, and hashish oil
- Cocaine
- LSD, Amphetamines, and Methamphetamines
- Benzodiazepines
- Designer drugs

Caution:

Handling chemical evidence involves exposure to a variety of hazardous substances that may be toxic, flammable, corrosive, or psychoactive substances. It is essential for forensic personnel, including crime scene investigators, laboratory technicians, and law enforcement officers, to follow strict safety protocols to prevent exposure, cross-contamination, and degradation of evidence.

Guidelines for Biological Matrices for Forensic Toxicology

Evidence	Collection, Packaging, and Preservation
Stomach/ Stomach contents (**Action**: Autopsy Surgeon)	• Collect the stomach with loops at both ends • There is no minimum quantity requirement for collection; however, any available amount should preferably be collected • Preserve in saturated Sodium Chloride (NaCl) solution • Package in an airtight, unbreakable, and leak-proof disposable container sealed with a Teflon insert • Leave 1/3 container volume empty to avoid pressure buildup

	• Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Intestine (**Action**: Autopsy Surgeon)	• Collect the 30 cm proximal part of the intestine • Preserve in saturated Sodium Chloride (NaCl) solution • Package in an airtight, leak-proof, and disposable container sealed with a Teflon insert • Leave 1/3 container volume empty to avoid pressure buildup • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Kidney (**Action**: Autopsy Surgeon)	• Collect 50 g of kidney tissue • Preserve in saturated Sodium Chloride (NaCl) solution • Package in an airtight, leak-proof, and disposable container sealed with a Teflon insert • Leave 1/3 container volume empty to avoid pressure buildup • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Liver (**Action**: Autopsy Surgeon)	• Collect (~50-100g) tissue deep within the right lobe, preferably along with the gall bladder • Preserve in saturated Sodium Chloride (NaCl) solution • Package in an airtight, leak-proof, and disposable container sealed with a Teflon insert • Leave 1/3 container volume empty to avoid pressure buildup • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Blood (**Action**: Autopsy Surgeon/Medical Officer)	• Draw ~20 ml Peripheral Vein blood (Femoral, Jugular, Sub clavian), or can be taken after opening the veins • Preserve per 10 ml of blood in 100mg of (Sodium Fluoride) NaF and 30 mg of Potassium Oxalate • Package in an airtight screw-cap glass bottle or vacutainer • For suspected drug poisoning cases, such as cocaine, plastic bottles should be avoided • In cases of CN and CO, a thin layer of liquid paraffin is advised over the top of the collected blood to avoid evaporation • Blood drawn from different parts of the body should be uniquely identified • Any irregular appearance of the blood sample (e.g., decomposed, denatured) should be noted on the request form

	• The tube(s) should be labeled with the individual's name, date, and time of collection. • Secure the package with evidence tape or seal • Store at 4–8^{0}C • Blood for determination of blood alcohol content, drug analysis, and sedatives should be submitted immediately (within 24 hours)
Urine (**Action**: Autopsy Surgeon/Medical Officer)	• Collect via Catheter or suprapubic puncture from the urinary bladder • Preserve per 10 ml of urine in 100 mg Sodium Fluoride (NaF) or 10 mg Thymol. • Package in a Sterile, leak-proof container with a screw cap • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Bile (**Action**: Autopsy Surgeon)	• Collect bile from the gallbladder using a hypodermic syringe • Collect all amounts before taking the liver specimen to avoid contamination • A full gall bladder with adjoining tissues is suitable for Morphine, other Opioids, and drugs like Chlorpromazine • Preserve in Sodium Fluoride (NaF), if there is a delay in chemical analysis • Package the sample into a leak-proof and unbreakable container. Preferably, in a 20 ml wide-mouth bottle, as it is a thick fluid • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Spleen (Action: Autopsy Surgeon)	• Collect ~50-100 g tissue • Preserve in saturated Sodium Chloride (NaCl) solution • Package in an airtight, leak-proof, and disposable container sealed with a Teflon insert • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Vitreous humor (**Action**: Autopsy Surgeon)	• Aspirate 2–5 ml using a syringe with a wide-bore needle. Especially when blood and urine are not available due to decomposition • Preserve in Sodium Fluoride (NaF) in the same way as for blood samples • Package in an airtight, leak-proof, disposable container sealed with a Teflon insert • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C

Cerebrospinal fluid (**Action**: Autopsy Surgeon)	• Mainly used for microbiology and virology • Collect by Lumbar puncture, cisternal puncture before dissecting the body, or from the subarachnoid space anterior to the brainstem after the opening of the skull but before removing the brain, or from the lateral ventricles • Preserve in NaF for toxicological analysis. An aseptic procedure should be followed in bacteriological studies • Package in sterile, labeled screw-cap vial • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Brain (**Action**: Autopsy Surgeon)	• Collect ~50-100 g tissue • Preserve in 10% neutral buffered formaldehyde for volatile poison cases; in Sodium Chloride (NaCl) for others • Package in a wide-mouth, sealed glass jar • Label and secure the package with evidence tape or seal • Store at room temperature (if preserved in formaldehyde) or refrigerate at 4–8^{0}C
Other Muscles, Skin, Puncture Marks, Heavy metal cases (**Action**: Autopsy Surgeon)	• Collect muscle, skin tissue, and puncture marks in injection cases (Insulin, Morphine, Diacetylmorphine (heroine), Cocaine, other drugs or toxins) without preservatives if it is to be examined immediately. Otherwise, preserve in a saturated solution of common salt (Sodium Chloride) • In cases of heavy metal poisoning, collect scalp or pubic hair and bone pieces. Preserve in Sodium Chloride (NaCl)/alcohol/thymol. *(Note: These tissues are usually preserved when the body is brought in an advanced stage of decomposition, unless specifically required)* • Package in dry paper envelopes or a glass vial. • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C
Insect/Snake bite site (Action: Autopsy Surgeon)	• Collect skin from the bite site. Also, collect one control sample of skin, one cm^2 in size • Preserve in a saturated solution of Sodium Chloride (NaCl) • Package in a sterile container • Label and secure the package with evidence tape or seal • Store at 4–8^{0}C • The history of the anti-venom injected shall be provided

Note: The samples of an individual having infectious disease should be marked with a red marker for the safeguard during handling.

Guidelines for Chemical Evidence


Evidence	Collection, Packaging, and Preservation
Food and Drinks (**Action**: Crime Scene Investigator)	• Collect all food and drink items suspected to be consumed by the victim or deceased • Package in a clean, appropriate food-grade container and then in a cardboard box • Label and secure the package with evidence tape or seal • Store at room temperature (refrigerate if perishable)
Acid/Alkali cases (**Action**: Crime scene Investigator/Autopsy Surgeon)	• Collect any suspected container having remnants of chemical and package them separately in a leak-proof container • Collect clothing of the victim, air dry, and package in cloth linen paper envelopes • Collect cotton swabs from affected body parts and package in sterile glass jars. • Label and secure the package with evidence tape or seal • Store at room temperature
Trap cases (**Action**: Crime Scene Investigator)	• Collect hand wash, and pocket wash separately, identifying sources of collection: like left or right hands, pocket of shorts/shirts, handles of furniture, currency notes, office bag, and purses etc, in glass bottles having sodium carbonate solution as preservative • Collect clothes and package them in a cloth-lined paper envelope • Collect a reference sample of Sodium Carbonate (Na_2CO_3) solution in a glass bottle • Label and secure the package with evidence tape or seal • Store at room temperature
Drug overdose cases (**Action**: Crime Scene Investigator)	• Collect all relevant items: syringes, sachets, foil wrappers, ampoules, etc. • Package each item separately in cloth-lined paper envelopes or plastic pouches. Embed the pouch in a cloth parcel.

	• Label and secure the package with evidence tape or seal • Store at room temperature
Liquor cases (**Action**: Crime Scene Investigator)	• Seize liquor bottles/cans. Draw a representative sample (one bottle per batch per brand) in the presence of a magistrate in accordance with the provisions of section 65 of the HP Excise Act 2011 • Package in a cardboard box • Label and secure the package with evidence tape or seal • Store at room temperature
Unknown chemicals (**Action**: Crime Scene Investigator)	• Collect powder & liquid sample and package, separately, in a leak-proof container • Never smell or taste any suspected chemical sample for identification purposes. • In case of large stained evidence, cut a small sample of the stained area and package it in a heat-sealed or re-sealable plastic bag. When cutting is not possible, swab with clean cotton (dry or alcohol-wet), air dry, and package in a heat-sealed or re-sealable plastic bag • Collect an unused swab as a control swab and package separately in a heat-sealed or re-sealable plastic bag • Label and secure the package with evidence tape or seal • Store at room temperature

Guidelines for Arson/Fire Evidence

Evidence	Collection, Packaging, and Preservation
Accelerants or Volatile substances (**Action**: Crime Scene Investigator)	• Collect in chemical compatible airtight container (aluminum/steel/glass) • Label and secure the package with evidence tape or seal • Store in cool, dry, well-ventilated area, away from heat, sparks, or flames
Fire debris (**Action**: Crime Scene Investigator)	• Collect all evidence of value, including debris, at the scene, especially near the ignition point • Package each item separately in airtight glass jar/metal can/heat-sealed nylon bag • Label and secure the package with evidence tape or seal • Store in a dry, cool area; protect from light and ignition
Miscellaneous like oil, grease (**Action**: Crime Scene	• If possible, collect original container. Otherwise, collect using glass pipette or disposable spatula • Package in a chemical-compatible airtight lid container • Label and secure the package with evidence tape or seal

Investigator)	• Store in cool, dry, well-ventilated area, away from reactive substances
Irritating chemicals(e.g., Pepper Spray) (**Action**: Crime Scene Investigator)	• If possible, collect original container. Otherwise, collect in an appropriate sized container • Package in chemical compatible airtight lid container • Label and secure the package with evidence tape or seal • Store in cool, dry, well-ventilated area
Cigarettes, Match boxes, Candles etc. (**Action**: Crime Scene Investigator)	• Collect with tweezer to avoid trace contamination • Package each item separately in heat-sealed plastic bags • Label and secure the package with evidence tape or seal • Store in cool, dry, away from ignition sources
Incendiary/Electronic /Mechanical devices (**Action**: Crime Scene Investigator)	• Collect each item separately in original condition. Do not attempt to dismantle • Package in fire-resistant container • Label and secure the package with evidence tape or seal • Store in cool, dry and well-ventilated area, away from any heated area • If suspicious, involve bomb disposal or EOD team.

Arson / Fire Evidence

Guidelines for Post-Blast Residues

Evidence	Collection, Packaging, and Preservation
Suspected chemicals of explosive nature like salt of Aluminium, Potassium, Sodium, Lead, Strontium etc. (**Action**: Crime Scene Investigator)	• Collect about 15-20 g of each substance separately using non-metallic tool • Package each item separately in clean, dry glass bottles and seal with inert stoppers(e.g., cork or rubber) (avoid screw caps) • Label and secure the package with evidence tape or seal • Store each item separately in cool, dry, and dark conditions • Transport each sample separately • Avoid jerk during transportation
Post-Blast residues (**Action**: Crime Scene Investigator)	• Collect only post-blast components and residues (e.g., wiring, metallic fragments, timer etcs) using non-metallic tools. • Package in non-reactive containers separately (e.g., plastic jars or HDPE bags) • Label and secure the package with evidence tape or seal • Store in a dry, cool area, away from heat or reactive substances
Soil/Reference Material (from blast site) (**Action**: Crime Scene Investigator)	• Collect ~1–2 kg from the seat of the explosion, using clean scoops. Include both top-soil and sub-soil • Package in non-reactive container (e.g., plastic jars or HDPE bags) • Label and secure the package with evidence tape or seal • Store in a dry, cool area, away from heat or reactive substances
Miscellaneous containers (used for explosives) (**Action**: Crime Scene Investigator)	• Collect entire container or remnant • Package in polythene, then in cloth • Label and secure the package with evidence tape or seal • Store in a dry, cool area, away from heat or reactive substances
Swabs from surfaces (**Action**: Crime Scene Investigator)	• Collect swab from affected surfaces (walls, doors, furniture, etc.) using cotton moistened with acetone or distilled water • Package swab in airtight glass vial or sealed plastic pouch • Label and secure the package with evidence tape or seal • Store in a refrigerated or cool area, away from light and air exposure
Wrappers (from explosives/ fireworks)	• Collect without touching the interior. • Package in a clean plastic pouch or paper envelope

(**Action**: Crime Scene Investigator)	• Label and secure the package with evidence tape or seal • Store in a dry area; avoid placing near volatile samples
Detonator fragments (**Action**: Crime Scene Investigator)	• Locate and extract from walls, ceilings, etc., using a non-metallic tool • Package in polythene pouch, then in cloth-lined paper envelope • Label and secure the package with evidence tape or seal • Store in a dry area separately in a non-metallic cabinet, clearly marked as detonator evidence
Batteries, wires, timers, tapes, printed circuits etc. (**Action**: Crime Scene Investigator)	• Collect all electronic components intact, wherever possible • Package separately in an anti-static bag or clean polythene bag • Label and secure the package with evidence tape or seal • Store in dry conditions, in a secure cabinet or electronics-safe container
Low explosives like fire crackers or their residues (**Action**: Crime Scene Investigator)	• Collect 4–5 no. each type of intact samples • Collect residues, in and around the explosion site, with a vacuum cleaner (if available) into clean containers • Package each item separately in a cardboard box/cloth parcel • Label and secure the package with evidence tape or seal • Store in a cool, dry and well-ventilated area, isolated from high explosives
Clothing (from victim/suspect) (**Action**: Autopsy Surgeon/Crime scene Investigator)	• Submit entire clothes, if possible. Avoid cutting or altering • Package each item separately in a cloth-lined paper bag or packet • Label and secure the package with evidence tape or seal • Store in a dry & ventilated area • Avoid the use of plastic container

Note: The high explosive gadgets (live) like bombs, grenades, etc are not accepted in the laboratory. In case of seizure of any live gadgets, crime scene investigators are required to invite the bomb disposal squad to detonate them.

Guidelines for Narcotic Drugs and Psychotropic Substances

The seized contraband will be referred to the laboratory directly from the Ld. Courts after inventory certification u/s 52A of the NDPS Act and as per SOP of the Hon'ble High Court vide letter No. HHC/VIG. /Misc. Instructions/93-V- 1992 dated 29.04.2024.Further, the following documents should be sent along with the seized material:

- FIR copy
- Seizure memo
- Inventory certificate
- Inventory orders from Ld. Courts
- NCB-1 forms in original and duplicate
- Test Memo-6 in original and duplicate
- Sample seal on a cloth piece

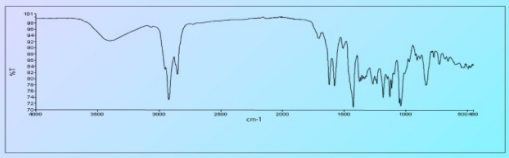
Evidence	Collection, Packaging, and Preservation
Opium, Ganja, Poppy straw, and Charas (**Action**: Crime Scene Investigator)	• Draw one representative and homogeneous sample of at least 24 g from the bulk. If the total quantity is less than 24 g, collect the entire seized amount • Package the sample in tamper-proof, moisture-proof containers (e.g., polythene bags within paper envelopes or plastic vials with screw caps) • Label and secure the package with evidence tape or seal • Store in a cool and dry area away from light and humidity
Heroin, Amphetamines, LSD, Cocaine (**Action**: Crime Scene Investigator)	• Draw a representative and homogeneous sample of at least 5 g. If the seized quantity is below 5g, collect the entire seized amount • Package in airtight, tamper-proof containers. LSD should be shielded from light (wrap in aluminum foil) • Label and secure the package with evidence tape or seal • Store in a low-light, cool, and dry area
Cannabis & Poppy plants	• Collect up to 10 whole plants from each suspected

(**Action**: Crime Scene Investigator)	cultivation area or field • Package plants in ventilated cloth or paper bags • Label and secure the package with evidence tape or seal • Store in a well-ventilated and dry area
Prescription drugs (**Action**: Crime Scene Investigator)	• Draw only representative samples, especially if batch numbers are identical. A maximum of 10 bottles or strips per type. Do not homogenize • Package in separate tamper-proof bags. Keep bottles upright • Label and secure the package with evidence tape or seal • Store in a cool and dry area away from narcotics and flammables

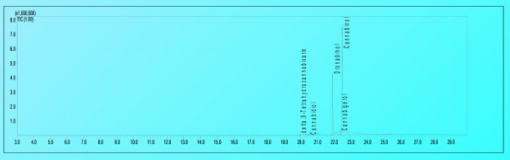
SUSPICIOUS CHOCOLATE BROWNIES

One of the popular bakery gained wide spread publicity for its newly launched Chocolate Brownie. Everyday, on opening, the chocolate brownies were sold within 2-3 hours. At times long queues were seen outside the bakery. After consumption, several customers showed unusual euphoric behavior. And complaint to police The police visited the bakery and registered a case. The field test didn't reveal anything. Then, the brownies were sent to lab for chemical analysis.

The chemical & instrumental examination revealed the presence of **Hashish (cannabis resin)**. (*Hashish is a narcotic drug regulated under the* ***Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985.***)



FTIR SPECTRA



GC-MS CHROMATOGRAM

On the basis of lab results, the police arrested bakery owner under Section 20 of the NDPS Act, for production, manufacture, possession, sale, purchase, transport, or use of cannabis and its derivatives.

Chapter 5

Handling of Physical Science Evidence

The Physics & Ballistics specialties play a vital role in uncovering the truth behind complex criminal activities, particularly those involving fire arms and ammunition. The application of physical principles is essential not only for analyzing bullet trajectories, impact angles, and firearm mechanisms but also for reconstructing shooting incidents with scientific precision. Beyond ballistics, this division is also responsible for the examination of various trace evidence—such as soil, glass, paint, fibers, tool marks, glass, building materials, road samples, and materials involved in vehicular accidents-which require detailed physical analysis to link suspect and victim to the crime scene.

Nature of Crime Cases:

- Firearm incident
- Burglary and robbery
- Physical assault
- Sexual assault
- Illegal hunting/poaching using firearm.
- Obliteration and alteration of serial number on vehicle & firearm.
- Explosion and explosive.

Caution:

- Be cautious of lead dust or chemical residue discharged from a firearm during an indoor incident.
- Always treat the weapon as loaded, even if it appears inoperative.
- Handle the weapon in such a way that latent fingerprints/touch DNA evidence are not destroyed. The weapon should therefore be first subjected to a preliminary examination of the fingerprint or the collection of a swab for touch DNA.
- Wet or submerged firearm must be preserved in the same water in which it was found to avoid rust and loss of trace evidence.
- Do not insert a finger into the trigger guard.
- Do not lift the weapon by placing a stick or similar object in the trigger guard/the barrel, as the weapon may get cocked.
- Do not mark firearm, bullet, cartridge, cartridge case, shot shell casing using sharp objects
- Never clean the bore, chamber, or cylinder before submitting a firearm to the laboratory.
- Never attempt to fire the firearm before its examination.
- Never point the firearm at anyone, including yourself.

Guidelines for Forensic Physics & Ballistics Evidence

Evidence	Collection, Packaging, and Preservation
All kinds of Firearms (Rifle, Revolver, Pistol, Shotgun, Improvised firearm, Air pistol/Rifle, Freak firearm etc.) (**Action**: Crime Scene Investigator)	• Record the position of the firearm, including hammer, trigger, and safety cock/lock • Grasp the firearm by the grip or non-mechanical surface • Close the muzzle end of the firearm using a cotton swab to avoid the escape of gases • Unload or secure the firearm to ensure it is in safe mode • Detach and separate all feed mechanisms • Protect the nipple/hammer with cotton before packaging • When it is necessary to send the firearm in loaded condition, the safety catch of the firearm should be kept in safe mode, and the nipple should be plugged with a cotton pad. Label the parcel as: • "Handle With Extreme Caution- Firearm in loaded condition" • Record serial number and any other identifying number • Wrap in a cloth cover, pad with cotton, and then package in a rigid cardboard or plastic firearm box • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area. Avoid extreme temperatures. Prevent rust, leakage, or GSR contamination
Ammunition (Unfired) (**Action**: Crime Scene Investigator)	• Remove ammunition from the chamber/magazine/ cylinder of the firearm carefully. Count and document • Wrap individually in cotton, package in a rigid plastic or wooden container • Label and secure the package with evidence tape or seal • Store separately in a cool, dry, and clean area • Keep away from magnetic/electrical fields
Ammunition (fired- Cartridge cases / fired shells) (**Action**: Crime Scene Investigators)	• Collect the cartridge case with plastic tweezers • In case of revolver and shotgun, note the chamber position of ammunition and collect with plastic tweezer • Wrap individual item in cotton, package in rigid plastic or cardboard box • Label and secure the package with evidence tape or seal • Store separately in a cool, dry, and clean area • Avoid exposure to moisture or heat • Do not clean
Ammunition (fired- Bullets/ Projectiles/ Pellets)	• Collect ammunition with plastic tweezer • Cut out the portion containing the bullet when the same is found adhered to the wall/door frame/hidden in the stump of a tree • Remove the surrounding material of the embedded

(**Action**: Autopsy Surgeon / Crime Scene Investigator)	bullet/projectile/air gun pellet to avoid any damage • Air-dry the bullet, pellet, and wad recovered from the body of the victim • Wrap individual item in cotton, package in rigid plastic or cardboard container • Label and secure the package with evidence tape or seal • Store separately in a cool, dry, and clean area • Avoid friction • Do not clean
Clothing of the victim and the suspect (**Action**: Autopsy Surgeon)	• In case of a gunshot residue/gunshot hole on cloth, cover the gunshot residue/each gunshot hole with a white paper sheet from outside and a backing cardboard sheet from inside • Wrap each item in clean white paper, package in a paper/cloth bag • Dry, label, and secure the package with evidence tape or seal • Store separately in a cool, dry, and clean area
Hand swab for Gun Shot Residue (**Action**: Crime Scene Investigator/ Autopsy Surgeon)	• Collect swabs from hands (preferably within 4-6 hours)/clothing, as soon as possible, using 5% Nitric acid / 5% Hydrochloric acid on filter paper • Dry, package in zip-lock poly pouches • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Gunshot holes on glass (**Action**: Crime Scene Investigator)	• Collect all glass pieces (e.g., from window, bottle, vehicle headlights, etc.) • Label large glass pieces with orienting marks (e.g. up/down, inside/outside), wherever applicable • Package glass piece(s) from different locations into separate container • Package a large glass piece in a cardboard box. Protect the broken or fractured edges of the glass from any additional damage or breakage • Place the small glass fragments onto a sheet of paper. Carefully fold the paper around the particles to contain them. Secure the paper using adhesive tape. Place the folded paper into a paper envelope • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Tool (**Action**: Crime Scene Investigator)	• Collect the tool by wearing gloves or using forceps • Package in a rigid box with padding to prevent shifting • Do not place the tool with other evidence-like object having a tool mark • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area

Tool marks on the objects (**Action**: Crime Scene Investigator)	• Collect the entire object without altering or touching the mark • If the object cannot be removed: Take high-resolution photograph with a scale for reference. Make a cast or impression of the tool mark using casting material • Package in a rigid box with padding to prevent shifting • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Glass and its fragments (**Action**: Crime Scene Investigator / Autopsy Surgeon)	**a) Larger, Intact Pieces** • Collect carefully using forceps or wearing gloves • Package in a rigid container or padded box to avoid breakage • Label each container with location and orientation information (e.g., "interior side up") **b) Small or Minute Fragments** • Use a clean sheet of paper or a brush and dustpan to collect. • Transfer into folded paper bindles (druggist's fold) and then package into a sealed envelope or small rigid container • Label clearly. **c) Glass from Suspect or Victim (Clothing, Shoes, Hair)** • Package the entire item separately in a paper bag or clean envelope • While collecting glass or glass fragments, other physical evidence like fingerprints, dust or dirt, blood stains, and foreign material should be well protected d) Do not mix glass fragments from different sources or locations e) Collect control glass fragments using forceps or wearing gloves from the site where remnants of glass are available The site must be as close as possible to the point of breakage f) Package the control sample in a rigid container or padded box to avoid breakage g) Label and secure the package with evidence tape or seal h) Store in a cool, dry, and clean area
Paint (**Action**: Crime Scene Investigator)	• Collect a small representative paint sample from the dented area using a clean spatula, razor blade to scrape, without damaging the beneath surface. If the paint is on a porous surface, carefully cut out a small section of the material, including the paint layers • Collect at least 1-2 square inches of area. If multiple layers of paint are present, take sample from each layer to analyze the composition • Collect a control sample from a site close to the dent area or an area near the site of a hit • Package in a clean, airtight container (glass vial or envelope). • Label and secure the package with evidence tape or seal

	• Store in a cool, dry, and clean area
Soil (**Action**: Crime Scene Investigator)	**a) From the Crime Scene** • Collect soil, using clean tools (e.g., stainless steel spoon, spatula, or trowel), from: o The suspected area of contact (e.g., near footprint, tire mark, buried object) o The control area nearby (at least 1–2 meters away from the suspected spot) o Take soil from the surface and subsurface (e.g., 0–5 cm and 5–10 cm layers) o If layered, collect and package each layer separately • For footprint or impression, collect soil from inside and around the mark • Package suspect and control samples of loose soil separately in a clean, leak-proof container • If the soil is moist, air dry, and package in a paper bag **b) From Shoes, Clothing, or Tools** • Do not remove the soil at the spot • Collect and package the entire item (e.g., shoe, shovel, clothing) in a clean paper bag **c)** Label and secure the package with evidence tape or seal **d)** Store in a cool, dry, and clean area
Ligature material (**Action**: Crime Scene Investigator/ Autopsy Surgeon)	• Collect (without altering its original condition) • Package in a paper/cloth bag • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Electric wire for short circuiting /Telephone wires (**Action**: Crime Scene Investigator)	• Collect by cutting the electric wires from the seat of the fire, using insulated tools, by securing both free ends • In case of long or looped wires, coil gently and secure with soft ties • Wrap in heat-resistant paper and package in a plastic zip bag • Label and secure the package with evidence tape or seal • Store in cool, dry and clean area
Telephone wires for tool marks and matching (**Action**: Crime Scene Investigator)	• **For tool mark** o Follow the guidelines of the tool and tool mark • **For matching** o Collect by cutting the telephone wire using the tool 5–10 cm beyond the visible damage, secure and mark both free ends o Collect the specimen sample of the telephone cable by cutting with a tool, secure and mark both free ends o Wrap in heat-resistant paper and package in a plastic zip bag

	○ Label and secure the package with evidence tape or seal ○ Store in a cool, dry, and clean area
Paper (**Action**: Crime Scene Investigator)	• Collect the paper without folding or bending and package it in a clean, flat envelope • Do not clip/staple the paper • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Fibers & Fabrics (**Action**: Crime Scene Investigator)	• **Visible Fibers or Fabric Fragments** ○ Use forceps to gently pick up the fiber-grasp as close to the end as possible to avoid damage to the structure. ○ Place directly into a paper bindle ○ Package in an envelope • **Trace or Loose Fibers** ○ Use adhesive tape lifts (preferably transparent forensic lifting tape) ○ Press gently on the surface (e.g., clothing, furniture, vehicle seat) ○ Mount the tape on a clear sheet or glass slide ○ Package in a slide box • **Control Fabric Sample** ○ Collect a small section of known fabric (e.g., from a suspect's clothing) by cutting tools ○ Collect an undamaged and representative piece (approx. 2x2 cm or larger) ○ Package in a clean paper bag • Keep each sample separate by location and source • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Foot Prints & Footwear Prints (**Action**: Crime Scene Investigator)	a) **Dry/Latent Print (on hard floors, dust, etc.)** • **Use electrostatic dust lifter:** ○ Take photograph along with scale ○ Lay the lifting sheet over the print and activate the device ○ Mount the sheet onto a black backing for contrast ○ Package in a cardboard folder or flat box b) **Wet or Bloody Prints** • Take a photograph along with a scale • Use gel lifters or plastic sheet overlays (for transfer) • Use clean paper or acetate to carefully lift, if possible • Package in a cardboard box c) **Plastic (3D) Prints (soil, mud, sand)** • **Use dental stone or plaster:** ○ Take photograph along with scale ○ Clean excess debris carefully without disturbing the print ○ Place a casting frame around the print ○ Mix and pour the plaster gently into the frame

	○ Dry before lifting ○ Package in a wooden box with a cushion of thermocol packing/ bubble wrap ○ Spray snow print wax before pouring casting material, if the prints are in snow d) If the footprints are on easily removable articles, forward the article as such after packing in an appropriate box/container e) Collect suspect shoes or footwear impressions f) Package each shoe in a separate paper bag g) Label and secure the package with evidence tape or seal h) Store in a cool, dry and clean area
Building material (**Action**: Crime Scene Investigator)	• Collect about 1.0 kg of building material using sterile tool to avoid contamination. Ensure a random sampling from various areas of the structure (e.g., walls, floors, or debris) • Package in a plastic bag/container • Label and secure the package with evidence tape or seal • Store in a cool, dry and clean area
Road sample for Bitumen (**Action**: Crime Scene Investigator)	• Collect 1.0 kg of the sample (asphalt, gravel, or tire tracks) road material using a chisel or core cutter from multiple locations around the scene • Each sample should be from 5-10cm^2 area • If layered, collect each layer separately • Sample at equal intervals (e.g., every 1, 2, or 5 meters), especially where gradual surface or material change occur • Package each sample separately in rigid metal tins or plastic jar/container • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area

Handling of Firearm at Scene of Crime

Collection of Paint Sample

Handling of Forensic Documents

The Forensic Documents deals with the examination of the disputed signatures, hand writings, printing (typewriting& computer), financial and security documents like currency notes, lottery tickets, legal stamps & seals, paper, ink, alterations, obliterations, erasers, charred exhibits, photocopies, etc. It is very important to note that most of the samples/exhibits are somehow linked to financial transactions. The Forensic Documents are generally encountered in the following types of crimes:

- Cheating/Fraud/Forgery
- Suicide
- Homicide
- Extortion

Guidelines for Forensic Documents

Evidence	Collection, Packaging, and Preservation

Hand written material (may include writing on paper, cloth, wall, etc)
 	
(**Action**: Crime Scene Investigator)
	• **Questioned document**
	  ○ Collect the entire questioned document or document bearing questioned content in its original form whenever possible
	  ○ Package the paper material in an envelope that fits the size of the exhibit
	  ○ Package the cloth material in an envelope or polythene bag
	  ○ Take the photograph with a scale of immovable material, like writing on the wall, and package it in an envelope that fits the size of the exhibit
	  ○ Label and secure the package with evidence tape or seal
	  ○ Store in a cool, dry, and clean area
	• **Standard Documents**
	  ○ **Non-Request samples/ admitted samples**:
	  ❖ Collect the writings written by an individual in their original language during the normal course of duty/work. These writings include notebooks, diaries, application letters, bank account opening forms, cheques, withdrawal receipts, etc., which can be obtained from the suspect's workplace, the suspect's residence, bank, relatives, school records, etc.

	❖ Samples should have a comparable amount of writing in relation to the amount in the questioned document ❖ Samples should preferably be of the contemporaneous period ❖ Package in an appropriately-sized envelope ❖ Label and secure the package with evidence tape or seal ❖ Store in a cool, dry, and clean area o **Request specimens (Specimen standards):** ❖ Collect the handwriting samples obtained from the suspect purposely for carrying out a forensic comparison. These are usually obtained before a Judicial Magistrate who dictates the required material to the suspect. The person obtaining these samples should familiarize themselves with the questioned document and have time to prepare for an interview with the suspect, have necessary materials ready, and try to duplicate the conditions of the questioned document as nearly as possible (representative, adequate, and comparable samples should be obtained) ❖ Samples should indicate the date on which they have been obtained ❖ Samples should indicate the name & age of the suspect and name of witness ❖ If the questioned document has small amounts of writing, the sample handwriting (both letters and numbers) of the suspect should be of similar wording ❖ Samples should strictly be as those of original documents ❖ The requested specimens should be sufficient in quality and quantity ❖ The sample should indicate the health condition, if possible ❖ Package in an appropriately-sized envelope ❖ Label and secure the package with evidence tape or seal ❖ Store in a cool, dry, and clean area
Signature examinations	• **Non-Request samples-Requirements** o Collect the documents bearing original signatures. o Samples should be dated

(**Action**: Crime Scene Investigator)	○ The date should preferably be before and after 2-5 years of the execution of the questioned signature ○ About 5-10 signatures made on various dates that are contemporary to the disputed document should be collected ○ Sample signatures should be of the same class as those on the disputed document ○ In case sample signatures are on official documents or bank documents, the same should be authenticated ○ Package in an appropriately-sized envelope ○ Label and secure the package with evidence tape or seal ○ Store in a cool, dry, and clean area • **Request Samples** ○ Collect the signature samples obtained from the suspect purposely for carrying out a forensic comparison ○ Samples should be dated and taken before the Judicial Magistrate ○ Samples should strictly be original copies ○ A minimum of 20 signatures per page and at least 8-10 pages should be taken ○ The person obtaining the specimen signature should indicate the writing position, abnormality, if any ○ Package in an appropriately-sized envelope ○ Label and secure package with evidence tape or seal ○ Store in a cool, dry, and clean area
Paper (with invisible indented entries) (**Action**: Crime Scene Investigator)	• Collect the entire paper without making any folds or markings to it, in a labeled envelope that fits the size of the paper. *(Please note that the envelope should be labeled before putting the exhibit into it to avoid the addition of extra marks.)* • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Stamps and Stamp Impressions (**Action**: Crime Scene Investigator)	• Collect the original documents bearing a questioned stamp impression • In case a questioned stamp is brought in for examination, either the stamp impression, preferably the genuine stamp (rubber stamp), should also be collected • Non-request sample documents that have similar stamp impressions made within the same period as the

	questioned stamp impressions should be submitted. For example, if a questioned stamp impression was made in 2020, documents with similar known genuine stamp impressions made in the same year should be collected • Package each document in an appropriately-sized envelope • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Type written material (**Action**: Crime Scene Investigator)	• Collect the suspect machine (typewriter, printer, photocopier), bubble wrap, and package the machine in a cardboard box • Collect non-request samples of documents known to have been made by the same machine in the nearest period of the disputed document, if available. Package in an appropriately-sized envelope • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area
Ink examinations (**Action**: Crime Scene Investigator)	• Collect the questioned document (where suspected alterations, obliterations, or additions have been made) strictly in its original form • To determine whether a specific writing could have been produced using ink from a specific writing instrument, collect both the writings (original copies) and the suspect writing instrument • Package in an appropriately-sized envelope • Label and secure the package with evidence tape or seal • Store in a cool, dry, and clean area

Chapter 6

Handling of Digital Forensic Evidence

Digital technology has transformed society, especially during and after the COVID-19 period. The digital traces, more often than not, provide not only essential leads but also irrefutable linking evidence in criminal investigations. Analyzing such traces is essential for gathering intelligence and infallible evidence in the Justice Delivery System.

The scientific approach for search and seizure of digital artifacts is the foremost step in ensuring the integrity of digital evidence. This type of evidence is time-sensitive and fragile. Failure to respond on time in seizure, collection, and preservation of such evidence may lead to serious threats such as alteration, deletion, and remote wiping of data.

Sources of Digital Evidence

Computers /Laptops and associated media devices (HDD, SSD, CDs, DVDs, flash drives (SD cards & Pen drives)	  
Cell phone (Android, iPhones, Feature phones), SIM Cards	  
DVR/NVR Drones GPS	  

Miscellaneous viz. Web pages, RFID Tags, e-diary, Smart cards, iPods	  
Any electronic device having storage	

Secure the Scene:

- Secure the scene to avoid loss, alteration, or destruction of any possible evidence. To achieve this, the following measures need to be taken:
  - Remove and forbid unauthorized personnel from accessing the scene (kept them away from mobile phones, Computers, or any other sensitive items, including power supplies). In addition, suspects should not be able to communicate with anyone who is not on-site, to prevent remote data destruction.
  - Quickly locate the most obvious elements, computers and mobile phones, especially those connected to the internet, and that need special assurance measures to prevent data loss.
  - Check the existence of a wireless network that allows access and modification of data from outside
  - Refuse any help offered by unauthorized personnel.

Caution:

Do not preview or work on the original evidence.

- Be cautious about overloaded power outlets, exposed wiring, and potential electrical hazards.
- Use anti-static equipment (band, mat, bag) to prevent damage due to electrostatic charge.
- Have a fire extinguisher nearby if dealing with overheated servers or faulty equipment.
- To ensure integrity, enclose the certificate under Section 63(4) Part-A schedule of BSA for any retrieved digital record.
- Keep the digital exhibits away from water, high humidity, and magnetic fields
- The exhibits should be protected from unnecessary shock
- Treat all components as ‘FRAGILE’ while transporting
- Document details of person(s) who handle the evidence.

Note: If any other material of evidential value (body fluids, fingerprints) is present, it should be collected before packaging.

Guidelines for Digital Forensic Evidence

Evidence	Collection, Packaging, and Preservation
Computer, Laptop and associated storage media (HDD/SSD etc) (**Action**: Crime Scene Investigator)	**a) Gathering evidence from Switched-OFF system**: • Make sure that the computer is switched OFF. Some screen savers may give the appearance that the computer is switched OFF, but the hard drive and monitor lights may indicate that the machine is switched ON • Remove the battery from laptop computers • Unplug the power cord from CPU • Never switch ON the computer (in any circumstances) • Open the side casing of the CPU of the Desktop • Identify the Hard Disk and detach gently the power & data cable from both the hard disk and motherboard • Remove mounting screws or brackets and take out the drive • Photograph the hard disk, record serial number, make, and model • Note down damage, if any • Label the drive • Package in an anti-static bag/ bubble wrap, and then in a rigid box • Fill any extra space with cotton or thermocol balls to avoid movement • Place HDDs vertically, if possible • Prevent stacking • Label and secure the package with evidence tape or seal • Store in a secure place b) **Gathering evidence from Switched-ON systems**: • Photograph the screen and note the contents (if it is ON). • If the screen is in sleep mode, do not touch the keyboard or click the mouse. Just give a short movement to the mouse to restore the screen. If screen restores, photograph/ videography. If the screen is password-protected, then continue following the steps given below • Capture volatile data, i.e. RAM(if required) • For a hard shutdown, pull the power plug from the back of the CPU/server for a Windows-based system

	• For Mac systems, a normal shutdown from the Apple menu, and for Linux systems, use the command prompt • For laptops, either push the power button until the system shuts off or remove the battery • Follow the process of seizure and preservation of the hard disk as mentioned at point a
Mobile Phone, Tablets (**Action**: Crime Scene Investigator)	**a) If the device is ON:** • Leave it ON, enable Airplane mode • Note down: Color, Make/model, IMEI/MEID, serial no. SIM/SD card number and visible defects (if any) • Photograph the device and screen display (if available) • Label and collect all the cables (including power supply) • Keep the device charged • Collect password/PIN info • Package in an anti-static bag/ bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place **b) If the device is OFF:** • Do not power ON. • Photograph and note color, make, model, and serial no. • Remove the battery from the feature phones and package them separately • Collect password/PIN info • Package in an anti-static bag/ bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place
Mobile Phones recovered from water (**Action**: Crime Scene Investigator)	• Do not dry or power ON • Photograph the current condition and location of the device • Do not remove the device from the water • Take a pan or a plastic container and place the phone with the same water in the container • Keep the device submerged under the water • Do not change the water • Package the container in a leak-proof evidence box and label it as "Water-Recovered" • Secure the package with evidence tape or seal • Transport it underwater to the Lab
Mobile Phones covered/contaminated with blood	• Do not turn ON the device • Photograph the current condition and location of the device • Collect the blood sample from the external surface for

(**Action**: Crime Scene Investigator)	Serological and DNA Analysis • Package in a leak-proof biohazard or sterile bag • Mark the packaging as "BIOHAZARD – Blood Contamination "Label and secure the package with evidence tape or seal • Store in a secure place
Mobile Phones recovered from a Dead Body (**Action:** Crime Scene Investigator)	• Check if the device is locked • Observe the lock screen. Don't attempt to unlock the device repeatedly; too many attempts may disable it or trigger a data wipe • If the body is warm and the fingerprint sensor is usable, try to unlock the phone using the deceased's fingerprint. Don't force the deceased's finger onto the sensor; apply gently and only if the body condition allows • Photograph the mobile in its original position before touching or moving it. Don't charge or connect the device to any unknown power source or computer • Enable airplane mode, if safe • Immediately package the device in a Faraday bag • Document every action taken on the device (including attempts to unlock with fingerprint) • Label and secure the package with evidence tape or seal • Store in a secure place
External storage media (USB, HDD/SSD, CDs/DVDs, Memory Cards) (**Action**: Crime Scene Investigator)	• Photograph the external storage device • Note down: make, model, serial no., capacity, unique IDs • Do not preview • If access to content is required, use a write-blocker device • Collect all related adaptors/cables • Label and Package in an anti-static bag/ bubble wrap or as per manufacturer specifications, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place
Drone (**Action**: Crime Scene Investigator)	• Approach the drone from behind to avoid cameras • Photograph the drone from multiple angles • Ensure the drone is fully powered off • Remove or discharge battery safely • Disable the drone's ability to fly using a method (e.g., covering it with a coat or net or removing the propellers) • Check for damage or any missing parts • Record the serial number, model, and attached devices (camera, GPS, sensors)

	• Remove any removable media (SD cards, USBs) and store separately in a labeled envelope • Package the Drone, Radio Controller, and Battery independently in separate Faraday/ anti static bags to prevent over-the-air contamination and remote wiping • Label and secure the package with evidence tape or seal • Store in a secure place
NVR/DVR/ Standalone Camera (**Action**: Crime Scene Investigator)	• Photograph DVR/ NVR/Standalone camera unit (front, back, serial labels) • Photograph the screen time w.r.t actual time • Note down: serial no., make, model, software used, visible defects, if any • When the seizure of the device is not feasible, export videos in the proprietary/ native format to a previously sanitized storage media • Calculate and record the SHA-256 hash value of the exported files/data • Collect power supply, remote, cables, and other accessories • Label DVR/ NVR/stand-alone camera and storage media with a unique ID • Package in an anti-static bag/ bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place
Server and Cloud (**Action**: Crime Scene Investigator)	• Identify the specific server and data sources relevant to the investigation (e.g., logs, user accounts, databases, virtual machines, network traffic) • Isolate the server or relevant data to prevent further alteration or contamination by disconnecting it from the network • Perform live acquisition of volatile data if the server must remain operational • Create a bit-for-bit copy (forensic image) of the server's storage media • Calculate SHA-256hash value of the acquired data and forensic image(s) • Package in an anti-static bag/ bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place

Chapter 7

Handling of Audio & Video Evidence

The audio-video recordings have become a powerful tool in all civil and criminal cases. Many crime cases—such as fraud, extortion, kidnapping, homicide, sexual assault, bribery, and cybercrime—rely heavily on linking the suspect directly to the crime through their voice, authenticity of recorded audio, video & image evidence to establish facts and support prosecutions.

The audio-video evidence can be easily altered or tampered with. Accordingly, it is essential to handle the evidence with the utmost care. Proper collection and preservation of such evidence ensures credibility, integrity, and reliability.

This chapter highlights the guidelines for the proper collection and preservation of audio-video evidence in safeguarding these critical exhibits in the pursuit of justice.

The digital/electronic devices commonly referred to in the laboratory include the following:

- Media devices (CDs, DVDs, flash drives (SD cards & Pendrives), External HDD/SDD

Procedure for Recording and Handling Specimen Voice Samples:

- Before bringing the suspect to the laboratory for recording the specimen voice sample, seek permission from the Hon'ble Court.
- Prepare the transcript of the conversation between the accused and victim be forehand, after careful listening in the same dialect/language.
- Bring seizure memo, permission of the Court, Transcript, independent witness etc. to the laboratory.
- After recording the specimen voice samples, the audio files must be copied onto the appropriate storage media and, along with a memorandum, are handed over to the investigating agency on the same day.
- Subsequently, the investigation agency must send the storage media containing the specimen voice sample and the storage media containing the questioned voice sample for analysis in the laboratory, along with relevant documents.

Guidelines for Audio & Video Evidence

Evidence	Collection, Packaging, and Preservation
Data in the external storage media (CD, DVD, Pen drive, External Hard Disk etc.) **after copying from the original storage device** (**Action**: Crime Scene Investigator)	• Photograph the original storage media (front, back, serial labels) • Note down: serial no., make, model, software used, time offset and visible defects • Export audio/video/image files in native format to appropriate storage media using a write blocker to prevent alteration • Calculate and record the SHA-256hash value of exported files • Label storage media with case ID and serial no. • Enclose certificate under Section 63(4) Part-A schedule of BSA 2023 • Package in an anti-static bag/bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place • If export of data is not possible, follow the guidelines as mentioned in Chapter 6: Handling of Digital Forensic Evidence
Original data present in external storage media (CD, DVD, Pen Drive, External Hard Disk etc.) (**Action**: Crime Scene Investigator)	• Photograph the media • Note down: make, model, serial no., capacity, unique IDs • If access to content is required, use a write-blocker and record the SHA-256 hash value of files • Collect all related adaptors/cables • Label uniquely (case ID, serial no. & capacity) • Enclose certificate under Section 63(4) Part-A schedule of BSA 2023 • Package in an anti-static bag/bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place

Reference image/Specimen image for photo matching examination (**Action**: Crime Scene Investigator)	• Capture the image from as many different angles as possible (at least five), including the angle of the questioned Video/Image **For soft copy of reference images:** • Export the images in the appropriate storage media using a write blocker to prevent alteration • Calculate and record the SHA-256 hash value of exported files • Label storage media with case ID and serial no. • Enclose the certificate under Section 63(4) Part-A schedule of BSA 2023 • Package in an anti-static bag/bubble wrap, and then in a rigid box • Label and secure the package with evidence tape or seal • Store in a secure place **For printed copy of reference images:** • Print the image from the relevant storage media • Write the details like case ID and the individual's details on the backside of the photographs • Enclose the certificate under Section 63(4) Part-A schedule of BSA 2023 • Package without folding or bending in a clean, flat, and labeled envelope • Do not clip/staple the photographs • Label and secure the package with evidence tape or seal • Store in a secure place

Chapter 8

Handling of Fingerprint Evidence

Fingerprint evidence remains a cornerstone of forensic science due to its scientific reliability, legal admissibility, and investigative value at the scene of crime.

Fingerprint evidence has been regarded as one of the most reliable and valuable form of physical evidence in criminal investigations. The uniqueness, permanence, and individuality of fingerprints make them an essential tool in the identification of suspects and the reconstruction of criminal events. Unlike many other form of evidence, fingerprints are highly resistant to alteration and remain unchanged throughout a person's lifetime, making them an ideal biometric for forensic comparison.

The presence of fingerprints at a crime scene can:

- Establishes identity
- Corroborate or contradict witness statements
- Relate suspects to specific locations
- Identify unknown persons through National Fingerprint Databases (NAFIS)
- Support or refute alibis and timelines

Caution:

- Use fingerprint powders (black, magnetic, fluorescent) with caution, —avoid inhalation.
- Handle powders and chemicals in ventilated areas.
- Avoid stacking or folding lift cards.

Handling of Finger Print Evidence

Guidelines for Fingerprint Evidence

Fingerprints	Collection, Packaging, and Preservation
Latent prints (**Action**: Crime Scene Investigator)	• Search for the latent fingerprints using oblique lighting • Develop the chance prints using appropriate powder • Photograph the prints with scale • Lift the fingerprints using fingerprint lifting tape and transfer to a contrast-colored backing card • Label & sign the prints from the backside • Package in a paper bag • Store in a cool and dry area
Visible prints (**Action**: Crime Scene Investigator)	• Locate the visible prints, if any • Photograph the prints using appropriate filters and scale • If on a removable surface, cut out the section • Note the details & label • Package in a plastic container • Store in a cool and dry area
Plastic Fingerprints (**Action**: Crime Scene Investigator)	• Photograph the plastic prints through angular illumination • If on candles, use gentle heating or casting (e.g., silicone or gelatin or ink) for development • Note the details • Packaging in rigid containers to prevent deformation • Label the container with all details, i.e., date, time, and location • Store in a cool and dry area
Fingerprints from dead bodies (**Action**: Autopsy Surgeon)	• If rigor mortis is not developed, place the body face down and arms extended over the head • Directly ink the fingerprints with a rubber roller and bring contact fingerprint strips of paper fixed on a spoon-shaped piece of wood, roll the paper slowly to get the rolled impressions on fingerprint card or paper fixed to a curved backing (e.g., wooden spoon) • If Rigor mortis is set in, the fist is clenched in, cut the base of the first phalange, and record the fingerprint as stated above • If the fingerprints are shrunken, dip the fingerprints in the hot water to restore them to normal size or inject air, glycerin, or liquid paraffin with a hypodermic syringe and record the fingerprint as above

	• If the dead body is in water for a longer time, cut the skin of the first phalange and preserve it in a formaldehyde solution in sealed jar. (The fingerprint pattern will develop on the inner side.) • If the skin is dehydrated, soak the finger in a 3% solution of potassium hydroxide in warm water for a short time to develop fingerprints. Ink and roll prints as usual • Fingerprint cards should be air-dried if inked, then package in fingerprint card holders/envelopes • If the skin is fragile, apply heavy metal salt (lead carbonate) with paraffin and record through X-Ray • Package Radiograph (X-ray film) in plastic sleeves or radiograph envelopes • Store in a cool and dry area

Specimen inked Fingerprints
 	
(**Action**: Crime Scene Investigator)
	• Write information of the individual on fingerprint card
	• Ensure the individual's hands are clean and dry prior to fingerprints
	• Apply a thin layer of ink to the inking slab
	• Roll each finger from nail edge to nail edge on the ink slab
	• Roll each inked finger onto the fingerprint card in designated boxes:
	  ○ Rolled impressions: from one edge of the nail to the other
	  ○ Plain impressions: press fingers straight down without rolling
	• Start with the right hand, followed by the left hand
	• Record thumb impression at last if using a ten-print card format
	• Ensure each print is clear, centered, and not smudged
	• Allow the card to dry before packing
	• Put sign with the date on the fingerprint card
	• Package in fingerprint card holder/envelope
	• Store the card securely or upload a digital copy to the fingerprint database

Lifting of fingerprint using lifters

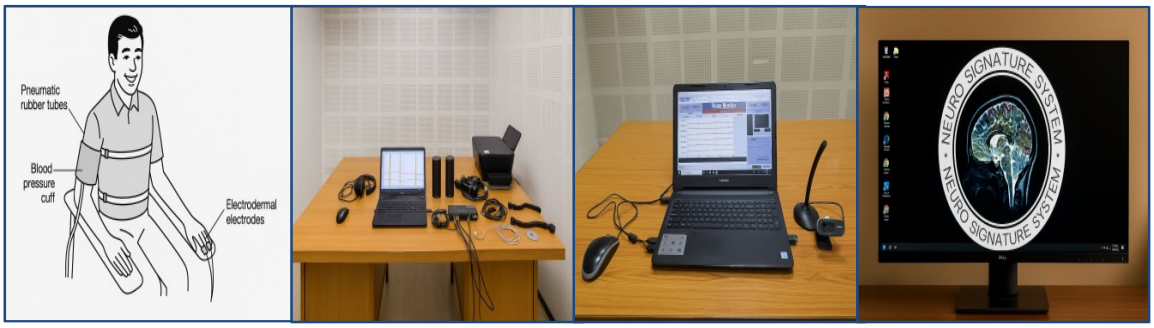
Chapter 9

Handling of Forensic Psychology Subject(s)

There has been a significant rise in societal awareness regarding the protection of human rights, particularly within the realm of criminal investigations. This shift has made it imperative to replace outdated and coercive third-degree interrogation methods with scientifically grounded, ethical alternatives.

Modern forensic psychology embraces scientific interrogation techniques that conform to established protocols and respect individual rights. These methods not only enhance the credibility of investigations but also streamline the interrogation process, allowing investigators to screen a large number of suspects or subjects efficiently and without infringing on their human rights.

To support this ethical evolution, the forensic psychology facility is now equipped with advanced, non-invasive technologies such as:



- Polygraph (Lie Detection)
- Layered Voice Analysis (LVA)
- Brain Electrical Oscillation Signature (BEOS)
- Criminal Profiling

These tools form the foundation of a humane and scientifically sound approach to interrogation. This chapter outlines guidelines about subject for the investigation officers and the requirements for conducting forensic psychological tests.

Guidelines for Forensic Psychology Subject(s)

1) **Informed Consent**

- Consent is mandatory only for Polygraph and BEOS tests. The written informed consent of the subject must be obtained prior to scheduling the test with the forensic laboratory.

2) **Physical and Mental Condition of the Subject**

- The subject should be well-rested, have taken adequate sleep before the examination.
- A proper meal at least 1–2 hours prior must be given to subject to avoid discomfort or distraction.
- The subject must not be suffering from fatigue, illness, or any form of physical or mental distress.

3) **Health Requirements for Specific Tests**

Polygraph Test:

- Subjects must be free from:
  - Respiratory disorders (e.g., cough, cold, sneezing, asthma)
  - Hypertension or blood pressure instability
  - Diabetes
  - Coronary or cardiovascular issues
  - Shivering or tremors
  - Any diagnosed mental illness or psychiatric condition

Layered Voice Analysis (LVA):

- Subject must have no speech impairments such as:
  - Stammering
  - Hoarseness

Brain Electrical Oscillation Signature (BEOS) Profiling:

- Subject must be free from:
  - Memory-related disorders (e.g., dementia, amnesia)

- Other cognitive impairments or psychiatric illnesses (e.g., schizophrenia, bipolar disorder)

4) Substance Use Restrictions

- The investigating officer must ensure that the subject has not consumed any of the following substances within 72 hours of the scheduled test:
  - Alcohol
  - Stimulants (e.g., caffeine in high amounts, amphetamines)
  - Depressants (e.g., sedatives, benzodiazepines)
  - Recreational or prescription drugs that may affect cognition or physiological response

5) Legal Observation Rights

- If the subject requests legal representation:
  - The lawyer must be informed in advance of the test date and time.
  - The lawyer may observe the examination through a glass window or observation pane.
  - However, the lawyer cannot interrupt or interfere in any part of the testing process.

6) Additional Recommendations

- Subjects should be briefed calmly to minimize anxiety.
- The medical history relevant to the subject's mental or physical health should be disclosed to the forensic examiner in advance.
- Any intense emotional activity (confrontation, panic, trauma) 24 hours before testing, which may affect physiological responses, should be avoided.

Himachal Forensics Ecosystem


Arson


Sexual Assault


Cyber crime


Road Accident


DNA profiling


Poisoning & Bribery


Fingerprint


Fire Arms


NDPS


Forgery


Murder


Lie detection

Crime Scene

District Forensic Units
Bilaspur, Baddi, Nurpur

State FSL
Junga Shimla
1988

Laboratory Testing

RFSL, CR
Mandi
2008

RFSL, NR
Dharamshala
2008

A First in India

Member of Asian Forensic Science Network

All FSLs NABL ISO/IEC 17025:2017 Accredited

MEITY, GOI, Notified RFSL, NR U/S 79A of IT Act,
DNA Database for unidentified dead bodies

Proficiency Testing : United Nation Office on Drugs and Crime (UNODC)
National Forensic Services, South Korea
Govt Laboratory, HongKong

Forensic Evidence in Pursuits of Truth

DIRECTORATE OF FORENSICS SERVICES

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