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FROM CRIME SCENE TO COURTROOM: THE ROLE OF FORENSIC EVIDENCE UNDER THE BNSS, 2023

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ABSTRACT

Forensic science offers scientific techniques for locating, gathering, analyzing, and assessing evidence, it has grown to be a crucial component of criminal investigations. The Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS) gives this role greater statutory recognition, particularly through Section 176(3), which provides for forensic examination and videography of crime scenes in specified serious offenses. This research examines the role of forensic evidence under the BNSS 2023 and traces its journey from the crime scene to the courtroom. With special attention to contamination and chain of custody, it emphasizes the importance of correctly identifying, gathering, preserving, transporting, and examining forensic material. The study also examines the relationship between forensic investigation under the BNSS and the evidentiary framework under the Bharatiya Sakshya Adhiniyam, 2023, including expert opinion, Evidence of the DNA and also the electronic evidence. Through judicial decisions, this research study highlights that scientific evidence cannot be treated as automatically conclusive and that its reliability depends upon the method of examination, integrity of samples, proper documentation and judicial scrutiny. The study further deals with practical challenges such as shortages of trained forensic personnel, laboratory capacity, delays, rural-urban disparities and quality control requirements. It concludes that the effectiveness of forensic reform under the BNSS depends not specifically on statutory requirements but on adequate infrastructure, trained manpower, reliable procedures, proper chain of custody and fair judicial evaluation of scientific evidence.

Keywords: Forensic Science, Bharatiya Nagarik Suraksha Sanhita, 2023, Section 176(3), Investigation, Scientific Evidence.

INTRODUCTION

The use of forensic science in contemporary criminal investigations and the administration of justice has grown in significance. It enables investigators and courts to examine physical and scientific evidence through systematic methods of collection, preservation, examination and analysis. Unlike Traditional evidence systems that depended entirely upon human recollection or observation. Properly collected forensic evidence can provide objective information capable of establishing connections between a crime scene, the circumstances of an offence and the individuals involved. Its significance becomes particularly evident in serious offences where identification of the offender, reconstruction of events and preservation of reliable evidence are essential to a fair criminal process. Forensic Investigation is the basic investigation and is commonly associated with Edmond Locard's Exchange Principle: "Every contact leaves a trace"¹. The principle reflects the idea that interaction between a person, object and environment may result in the transfer or creation of material traces capable of assisting an investigation. Such traces may include fingerprints, biological material, DNA, fibres, impressions and other physical or digital evidence. However, the evidentiary value of such material depends not merely upon its discovery, but upon its proper identification, collection, preservation, documentation, examination and presentation. Any contamination, alteration or improper handling at an early stage may affect the reliability and subsequent use of the evidence.

As forensic science has evolved over time, it has helped make criminal investigations more scientifically grounded. Traditional investigations have often relied on subjective evidence, such as eyewitness accounts, statements, confessions and investigative observation. Scientific methods provide an additional means of testing and corroborating facts through objective evidence that can be examined using established techniques. This does not mean that forensic evidence is infallible or that scientific investigation can replace all other forms of evidence. Rather, its importance lies in providing investigators and courts with an additional, systematic and verifiable basis for understanding the circumstances surrounding an offence. Traditional methods may be vulnerable to error or manipulation, particularly where investigations depend heavily on eyewitness testimony and human recollection. Scientific investigation, on the other hand, involves evidence that is systematically collected, documented, preserved, and analysed before being presented. This provides a more objective and verifiable basis for understanding

¹ Edmond Locard, The Analysis of Dust Traces, American Journal of Police Science, Vol. 1, No. 3, pp. 276–291 (1930)

the facts of a case. The evolution from traditional to scientific investigation signifies a change in the direction of making sure that evidence is thoroughly investigated, confirmed, recorded, and backed by scientific techniques so that it can be evaluated objectively. It represents a shift towards ensuring that evidence is properly examined, verified, documented, and supported by scientific methods so that it can be objectively assessed.

This changing approach has received significant statutory recognition under the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS)² which replaced the Code of Criminal Procedure, 1973³, subject to the statutory exception indicated in the commencement notification. The growing importance of technologically and scientifically supported evidence in the criminal justice system is reflected in the BNSS's numerous provisions pertaining to the use of technology and scientific procedures in criminal investigations. Among these provisions, Section 176(3) of the BNSS⁴ acquires particular weight. In cases involving offences carrying a sentence of seven years or more in prison, the provision establishes a statutory duty for forensic inspection and videography of the crime scene. The provision is significant because it seeks to move forensic investigation beyond merely discretionary or occasional reliance and towards a more structured role within the investigation of serious offences. The emphasis on crime-scene examination and documentation also recognises that evidence may be lost, contaminated or altered if it is not identified and preserved at the earliest stage of an investigation.

The introduction of a statutory forensic mandate, however, raises several practical and legal questions. The effectiveness of Section 176(3) cannot be determined solely by the existence of the statutory requirement. The availability of qualified forensic specialists, well-equipped forensic labs, suitable crime-scene infrastructure, prompt sample collection and transportation, upkeep of the chain of custody, technological capability for videography, and efficient coordination between investigating officers and forensic institutions are all necessary for its implementation. Differences in infrastructure and institutional capacity may also affect the uniform implementation of the provision across jurisdictions. Consequently, there exists a need to examine whether the statutory recognition of forensic investigation under the BNSS can effectively translate into reliable, timely and scientifically sound criminal investigation in practice. The issue is also closely connected with the broader objective of a fair criminal justice system. Forensic evidence can assist not only in establishing the involvement of an accused but

² Bharatiya Nagarik Suraksha Sanhita, Act No. 46 of 2023.

³ Code of Criminal Procedure, 1973

⁴ Bharatiya Nagarik Suraksha Sanhita, No. 46 of 2023, § 176(3).

also in excluding individuals who are not connected with the offence. Its proper use may therefore contribute to both effective investigation and protection against erroneous implication. At the same time, over-reliance upon scientific evidence without adequate standards of collection, preservation, interpretation and judicial scrutiny may create its own evidentiary concerns. The legal framework must therefore balance the advantages of scientific investigation with procedural safeguards and reliability standards.

In light of this, this study investigates the function and application of forensic investigation in accordance with Section 176(3) of the Bharatiya Nagarik Suraksha Sanhita, 2023. It seeks to analyse the extent to which the provision strengthens science-based criminal investigation, the procedural and infrastructural challenges associated with its implementation, and the safeguards necessary to ensure the reliability and evidentiary value of forensic material. The study further considers whether the statutory mandate represents a meaningful transformation in criminal investigation or whether its effectiveness ultimately depends upon the institutional capacity available to implement it.

RESEARCH GAP

Forensic science and scientific investigation have been given more weight in the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS), especially in light of Section 176(3), which permits forensic examination and videography of the crime-scene investigation in some significant offenses. However, existing discussions largely focus on the importance of this provision and the shift from traditional investigation towards scientific investigation. The entire path of forensic evidence from the crime scene to the courtroom has received relatively little attention. The value of forensic evidence depends on both the accuracy of scientific testing and the proper handling of the evidence throughout the investigation. Therefore, issues relating to chain of custody, crime-scene videography and the consequences of improper handling of evidence require further examination. The entire process of forensic evidence from the crime scene to the courtroom has received relatively little attention. The evidentiary value of forensic evidence may be impacted by gaps or abnormalities in the chain of custody, which must also be understood by courts.

Another area requiring attention is the increasing use of digital and cloud-based evidence. Modern investigations may involve evidence stored on mobile phones, computers, servers and cloud platforms. Questions may arise regarding its collection, preservation, authentication, encryption and protection from alteration or deletion. The link between the investigation requirements under the BNSS and the evidentiary framework for electronic and digital

documents under the Bharatiya Sakshya Adhiniyam, 2023 (BSA) hence warrants more analysis.

The practical implementation of forensic investigation also depends upon the availability of trained forensic experts, properly equipped laboratories and reliable quality-control procedures. The accused must, however, be given a fair chance to contest forensic evidence and, if needed, request independent testing. The manner in which Courts deal with conflicting, incomplete or unreliable forensic opinions is another important area that requires consideration.

Therefore, the research gap lies in examining whether the BNSS has created an effective and reliable forensic-investigation framework, rather than merely imposing a procedural requirement. This study seeks to examine the entire evidentiary pathway from crime-scene collection and preservation to forensic analysis and courtroom evaluation, with particular focus on chain of custody, videography, digital evidence, laboratory standards, defence access and judicial evaluation of forensic evidence.

RESEARCH QUESTIONS

The following queries serve as the foundation for the study:

1. In what ways has the BNSS, 2023 altered the function of forensic science in criminal investigations?
2. What does the BNSS's Section 176(3) mean?
3. What precautions must be taken to guarantee that evidence gathered from a crime scene is trustworthy until it is presented in court?
4. What are the principal infrastructural and institutional difficulties faced by forensic laboratories in India?
5. How should Courts evaluate forensic and expert evidence?
6. What is the legal situation if Section 176(3)'s required forensic procedure is not carried out?
7. What reforms are necessary to ensure effective implementation of scientific investigation under the BNSS?

RESEARCH METHODOLOGY

The current study takes an analytical and doctrinal stance. It is based on a systematic study of statutory provisions, judicial decisions, Government reports, parliamentary materials, official forensic policy documents, and relevant secondary sources such as books, research articles, legal journals, and academic literature. These sources are used to understand the existing legal

framework, identify practical challenges, and analyse the role of forensic investigation under the BNSS, 2023.

The Bharatiya Sakshya Adhiniyam, 2023 (BSA) and the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS) are the main legal sources taken into consideration in this study. To comprehend the changing legal situation regarding forensic evidence, pertinent court rulings pertaining to expert opinion, DNA evidence, scientific investigation, electronic evidence, and the maintenance of the chain of custody have also been reviewed.

Government and institutional sources have been consulted to assess the practical framework for forensic investigation, particularly with regard to forensic laboratories, trained personnel, technological infrastructure, mobile forensic facilities, and ongoing reforms. These materials also show ongoing efforts to improve forensic infrastructure in response to the heightened demands brought about by the new criminal statutes.

The study is not based on a primary field survey. Its findings and observations are drawn from the available statutory, judicial, governmental, institutional, and academic sources and are analysed in the context of the objectives of the research.

OBJECTIVES OF THE STUDY

The objectives of this research paper are –

1. To analyse the role forensic science plays in the administration of justice.
2. To examine the BNSS, 2023 legal framework pertaining to forensic evidence.
3. To examine the challenges in the case of crime scene contamination and improper collection and handling of evidence.
4. To study the validity and admissibility of forensic evidence used in court.
5. To investigate how forensic science aids in the administration of justice by connecting evidence to the commission of a crime.
6. To examine the shortage of forensic experts, laboratory infrastructure and forensic capacity in India.
7. To identify practical problems relating to crime-scene management, preservation and chain of custody.

HYPOTHESIS

The research proceeds on the hypothesis that:

"By institutionalising scientific evidence collection, Section 176(3) of the BNSS, 2023 has the

potential to transform criminal investigation; however, its effectiveness depends upon adequate forensic infrastructure, trained manpower, strict chain-of-custody procedures, scientific quality control, and clear judicial standards for evaluating forensic evidence."

LEGAL FRAMEWORK UNDER BNSS, 2023

Section 176⁵ deals generally with the procedure that police must follow while investigating an offence. Section 176(3)⁶ is a new sub-section and is particularly important for scientific investigation, as it adds a specific forensic requirement for serious offences. The provision says that a police officer must arrange for a forensic expert to attend the crime scene and gather forensic evidence when they get information about an offense carrying a sentence of seven years or more in prison. Additionally, the process must be recorded through electronic means. "The officer in charge shall cause the forensic expert to visit the crime scene"

This puts the onus of scheduling the forensic expert's visit to the crime site on the officer in charge of the police station. The police officer is not expected to personally perform every scientific examination. The forensic specialist helps by carefully and scientifically analysing and gathering evidence from the crime site while the police handle the overall investigation.

This is why Section 176(3) should not be understood as replacing ordinary police investigation with forensic investigation. It is intended to integrate forensic science into the investigation. The BNSS's Section 176(3) signifies a change from a predominantly arbitrary approach to forensic investigation to a system that is both legally recognised and organised. In accordance with Section 157⁷ of the CrPC, there was no such legal obligation to guarantee the presence of a forensic expert at the crime scene for offences carrying a specific degree of penalty. The BNSS therefore gives greater importance to the scientific collection and preservation of evidence.

However, additional clarification is needed about the application of Section 176(3). The provision does not mean that forensic experts are required to visit crime scenes across the entire country from 1 July 2024. Rather, it stipulates that the requirement will take effect within five years on a date announced by the relevant State Government. For example, Rajasthan issued a notification under Section 176(3) on October 7, 2024, according to the Bureau of Police Research and Development's State notification table.

Therefore, Section 176(3) establishes a national statutory framework for forensic investigation,

⁵ BNSS, § 176.

⁶ BNSS, § 176(3).

⁷ Code of Criminal Procedure (CrPC), 1973, § 157.

while its actual implementation depends on State-level notifications, availability of forensic resources, and the necessary institutional arrangements.

Why does Section 176(3) require videography?

This is the second major requirement in forensic evidence. As previously mentioned, the legislation mandates that a cell phone or other electronic device be used to record the process of gathering forensic evidence. The integrity and authenticity of the crime scene are significantly protected by videography. It creates a contemporaneous visual record of the scene, preserving its original condition and documenting the manner in which forensic evidence is identified, collected, handled, sealed and preserved. To give a more accurate picture of the conditions under which the evidence was obtained, it may additionally record the surrounding area as well as the location and state of pertinent objects and evidence. Such documentation reduces the scope for subsequent manipulation, alteration or dispute regarding the handling of evidence. It also makes it possible for the court and the investigative authorities to later assess how the crime scene was investigated and if the forensic team followed the guidelines. Therefore, videography strengthens transparency, accountability and evidentiary integrity in the investigation process.

AUDIO-VIDEO DOCUMENTATION

Section 176(3) is not restricted to physical collection of evidence. It also requires videography of the collection process.

This requirement is supported by the wider approach of the BNSS. Section 105 of the BNSS⁸ stipulates that audio-video electronic recordings of the search and seizure procedures, including the creation and signing of the seizure list, must be made. Section 185⁹ similarly provides for audio-video recording of searches conducted during investigation.

These provisions have significance beyond mere record keeping. Video documentation can help establish:

- A. The state of the crime
- B. The location from which an article was recovered;
- C. The manner in which evidence was collected;
- D. The persons present during collection;
- E. The preparation and signing of seizure documentation; and
- F. The consistency between the findings at the site and the subsequent analysis.

⁸ BNSS, § 105.

⁹ BNSS, § 185.

BPR&D¹⁰ has developed a detailed Standard Operating Procedure dealing with crime-scene audio-video recording, including photography, scene processing, storage and transportation, documentation and chain of custody.

THE LEGAL IMPLICATIONS OF NOT COMPLYING WITH BNSS SECTION 176(3)

Section 176(3)¹¹ uses obligatory language: the police officer “shall” cause the forensic expert to visit the crime scene

When investigating major offences defined by Section 176(3) of the BNSS, the police have a significant obligation to consult a forensic specialist. However, the section does not specifically mention any separate punishment, fine, or imprisonment for an officer who fails to comply with this requirement.

Even though there is no specific punishment under Section 176(3), failure to follow the provision can still affect the investigation. If a forensic expert does not examine the crime scene or important evidence is not properly collected, documented, or preserved, valuable evidence may be lost or become difficult to rely upon later. This may also allow the defence to question the reliability and proper handling of the evidence. The Court may therefore examine the reasons for such non-compliance and consider whether it has affected the investigation or the evidence presented before it. Nonetheless, the trial would not automatically be declared invalid due to failure to comply with the inquiry. The Court would take into account each case's specific facts as well as how the non-compliance affected the available evidence. In addition, where the failure is due to negligence or deliberate disregard of duty, the concerned police officer may also face departmental or administrative action under the applicable service rules. As a result, Section 176(3) is crucial for ensuring that scientific evidence is correctly gathered and kept from the start, in addition to requiring the involvement of forensic experts. The inquiry may be weakened and the forensic evidence presented to the court may lose some of its evidentiary value if the rule is not followed.

BHARATIYA SAKSHYA ADHINIYAM, 2023 AND FORENSIC EVIDENCE

While the Bharatiya Sakshya Adhiniyam, 2023, offers the legal foundation for deciding how courts may utilise scientific and digital evidence (BSA)¹² the BNSS primarily addresses the

¹⁰ The Bureau of Police Research and Development (BPR&D).

¹¹ BNSS, § 176(3).

¹² Bharatiya Sakshya Adhiniyam, 2023 (BSA).

inquiry process.

1. Expert Opinion is covered by Section 39 of the BSA

Section 39 of the BSA¹³ It stipulates that the opinion of an individual with specialized knowledge or expertise in a certain subject becomes significant information when a court must make a decision on issues pertaining to science, art, specialized fields, handwriting, or finger impressions.

This provision recognises that certain matters require specialised scientific or technical knowledge which the Court may not possess. As a result, the Court can better comprehend and assess such evidence with the help of the conclusions and opinions of certified experts. The provision refers to the opinion of persons who are “specially skilled” in the relevant field (Bharatiya Sakshya Adhiniyam, 2023, s. 39).

However, expert evidence is not automatically accepted as conclusive proof. The Court is still required to examine the expert’s opinion along with the other evidence presented in the case.

In *State of Himachal Pradesh v. Jai Lal*, (1999) 7 SCC 280¹⁴, the Supreme Court described expert evidence as being “of an advisory character.” The Court explained that an expert’s opinion should assist the Court in reaching its own conclusion rather than replace the Court’s independent assessment. The reliability of such evidence depends on the reasons given by the expert and the scientific data and material supporting the opinion. This principle continues to be significant under the BSA. Forensic evidence can provide valuable scientific assistance to the Court, but the final assessment of the evidence remains with the Court. As a result, the Court must take into account both the expert opinion and the case's overall facts and circumstances.

2. DNA Evidence: Powerful but Not Infallible

One of the most important instruments in contemporary forensic investigation is DNA analysis. It can assist in establishing a person's identity and identifying a biological connection. However, how the sample is gathered, stored, analysed, and interpreted has a significant impact on the validity and reliability of DNA evidence.

The *State of Gujarat v. Kishanbhai*¹⁵ case concerned a six-year-old girl who was raped and killed. The prosecution case was mainly based on circumstantial evidence. The accused was convicted by the trial court, but the High Court later acquitted him because there were several gaps and weaknesses in the investigation and evidence. The matter then reached the Supreme

¹³ BSA, § 39.

¹⁴ *State of Himachal Pradesh v. Jai Lal*, (1999) 7 SCC 280: AIR 1999 SC 3318.

¹⁵ *State of Gujarat v. Kishanbhai*, (2014) 5 SCC 108.

Court. The fact that the victim and the accused had the same blood type (B positive) was a significant problem. The Supreme Court noted that it was impossible to determine whether the victim's blood was genuinely on the accused's clothing just because they shared the same blood group. The investigating agency should have gone further and conducted DNA profiling. DNA testing could have provided stronger scientific evidence about whether the accused was connected with the crime.

Therefore, the Supreme Court emphasized that investigating authorities should make appropriate use of available scientific procedures rather than relying solely on conventional methods of investigation, given the growth of forensic science.

FORENSIC INFRASTRUCTURE AND THE IMPLEMENTATION OF BNSS

The success of scientific investigation under the BNSS, 2023 depends not only on what the law provides, but also on whether the necessary forensic facilities are available when they are needed.

Since the journey of forensic evidence starts at the crime scene, investigators must have access to forensic support as soon as possible.

District Forensic Science Laboratories (DFSLs), State Forensic Science Laboratories (SFSs), and Central Forensic Science Laboratories (CFSs) are among the various layers of laboratories that make up India's forensic system. These facilities play an important role in examining and analysing evidence collected during criminal investigations. District-level facilities can provide forensic assistance closer to the crime scene, while State and Central laboratories provide broader and more specialised forensic examination.

This becomes more crucial in light of Section 176(3) of the BNSS, which mandates that forensic professionals visit the crime site and gather forensic evidence in certain major offenses after the provision is put into effect in the relevant State. The provision can achieve its intended purpose only when trained forensic personnel, suitable equipment, laboratories, and proper transportation and preservation facilities are available.

In practical terms, the effectiveness of forensic investigation depends on the entire system working together. If a forensic team is unable to reach the crime site in time, if a district does not have suitable forensic facilities, or if a sample has to travel long distances without proper preservation, the quality and reliability of the evidence may be impaired. Therefore, improving forensic infrastructure is a crucial component of making Section 176(3) successful and is not

distinct from its execution.

The existence of CFSs, SFSs and district-level forensic facilities shows the importance of building forensic capacity at different levels. However, the real objective should be to ensure that a person investigating a crime is able to obtain appropriate scientific assistance when and where it is required. Only then will the evidence gathered at the crime site be able to pass through the forensic procedure in a safe and dependable manner and eventually make it to the trial.

“WHAT HAPPENS IF MANDATORY FORENSIC EXAMINATION IS NOT CONDUCTED?”

In *Dashwanth v. State of Tamil Nadu*¹⁶, decided on 8 October 2025, the Supreme Court assessed significant holes in the prosecution's case based on circumstantial evidence. The Court found that important circumstances, including the “last seen together” theory, missing CCTV footage, alleged planted recoveries, and the proper custody of DNA samples, had not been satisfactorily established.

With regard to the DNA evidence, the prosecution was unable to adequately demonstrate the chain of custody of the samples from their collection. The Court therefore questioned whether the integrity of the samples had been sufficiently maintained. This affected the reliability that could be placed on the scientific evidence.

The case demonstrates that forensic evidence cannot be considered reliable merely because a scientific report has been produced before the Court. Additionally, the prosecution must be saved, transferred, sealed, examined, examined, examined, and the prosecuted, preserved. Therefore, the evidentiary value of forensic evidence may be diminished by a breach or unexplained gap in the chain of custody.

THE JOURNEY FROM CRIME SCENE TO COURTROOM

Stage One: Identification of Forensic Evidence

The method of identifying forensic evidence is the primary stage during the crime investigation. Evidence may be present in different forms, depending on the nature and circumstances of the crime. It may include:

- A. Fingerprints;
- B. Blood And Other Bodily Fluids;

¹⁶ *Dashwanth v. State of Tamil Nadu*, 2025 INSC 1203.

- C. Other Biological Materials;
- D. Hair And Fibres;
- E. Weapons And Ammunition;
- F. Footprints And Tool Marks;
- G. Questioned Or Disputed Documents;
- H. Drugs, Poisons and Other Substances;
- I. CCTV Footage;
- J. Mobile Phones and Computers;
- K. Photographs and Videos; And
- L. Other Forms of Trace Evidence.

When forensic evidence is discovered, its relevance may not always be immediately obvious. Material that may appear insignificant to an ordinary observer can yield important information when examined using scientific and forensic methods. It could establish a person's identification, connect them to a crime scene, or offer further information pertinent to the inquiry.

Therefore, the role of the first responder and crime-scene investigation team is extremely important. The crime scene must be approached and handled carefully to prevent potential evidence from being contaminated, altered, misplaced, or destroyed. A careless or improper response at this initial stage may result in the permanent loss of valuable evidence and may affect the subsequent investigation and judicial proceedings.

Stage Two: Documentation of the Crime Scene

Once possible evidence has been identified, the crime scene must be properly documented before the evidence is disturbed or removed. Documentation keeps a physical record of the condition of the crime scene as it was found by the investigating team.

The scene may be documented through photographs, videos, notes, sketches, measurements, and other appropriate records. The location and condition of the evidence should be recorded carefully so that its original position and surroundings can later be understood. Proper documentation also helps show how the evidence was found and how the crime scene appeared before the investigation altered it.

This stage is important because the crime scene cannot remain unchanged forever. It may be challenging to restore the scene to its former state once evidence has been gathered or items have been relocated. A proper record therefore helps preserve the scene for further investigation and for presentation before the Court.

Stage Three: Collection and Recovery of Evidence

After the crime scene has been properly documented, the identified evidence is carefully collected and recovered. The manner in which evidence is collected depends upon its nature. Different sorts of evidence may require different sorts of methods of handling, packaging, and preservation.

Biological material, fingerprints, weapons, documents, digital devices, and other forms of evidence must be handled with appropriate care. The objective is to collect the evidence without damaging it or introducing anything that may affect its later examination.

At this stage, even a small mistake can affect the usefulness of the evidence. Therefore, the investigating and forensic teams must follow the appropriate procedures while collecting and packaging each item.

Stage Four: Preservation and Chain of Custody

After collection, the evidence must be properly preserved, and its movement must be recorded. This is where the chain of custody becomes important. It means keeping an accurate log of who gathered the evidence, how it was handled, where it was kept, when it was moved, and when it arrived at the forensic lab.

From the moment the evidence is gathered until it is analysed and presented in court, the goal is to preserve its identity and integrity. Evidence can be prevented from being lost, replaced, tainted, or tampered with by properly sealing, labelling, storing, transporting, and documenting it.

Stage Five: Transportation to the Forensic Laboratory

Once the evidence has been collected, packaged, and preserved, it is transported to the appropriate forensic laboratory for examination. The type of evidence may determine the mode and circumstances of transportation.

During transportation, the evidence must remain properly sealed and protected. As part of the chain of custody, its movement should also be accurately recorded. Any unexplained gap or irregularity in the movement of evidence may raise questions about its identity or integrity.

Stage Six: Scientific Examination and Analysis

Forensic experts examine the material using appropriate scientific methods and techniques depending upon the nature of the evidence. Different types of evidence may require different forms of examination. For example, biological material may be examined through DNA

analysis, fingerprints may be compared for identification, and questioned documents may be examined to determine their authenticity or connection with a person. Other evidence may require techniques such as microscopy, chromatography, ballistic examination, or digital forensic analysis.

Stage Seven: Preparation of the Forensic Report

After completing the scientific examination, the forensic expert prepares a report containing the findings of the examination. The report records the evidence examined, the methods used, and the results obtained from the analysis. The forensic report becomes an important link between the scientific examination and the legal investigation. It communicates the scientific findings to the investigating authorities and, where relevant, to the Court.

However, a forensic report does not determine an accused person's guilt or innocence on its own. Its findings form part of the evidence that must be considered along with the other material available in the case.

Stage Eight: Use of Forensic Evidence During Investigation

The forensic examination's conclusions can then help the investigating authorities comprehend the facts surrounding the crime. The results may help establish connections between the crime scene, the victim, the accused, and other relevant material.

Forensic findings may also support or contradict other evidence collected during the investigation. In this way, scientific evidence can help investigators form a clearer understanding of what may have happened and how the different pieces of evidence are connected.

Stage Nine: Presentation Before the Court

The final stage of the journey is the presentation and evaluation of forensic evidence before the Court. Subject to the relevant legal requirements, the forensic report and any pertinent data may be included in the evidence presented to the court. Where necessary, the forensic expert may also be required to explain the examination, methodology, and findings. The Court then evaluates the forensic evidence along with the other evidence available in the case.

The Court does not simply accept scientific evidence because it comes from a forensic laboratory. The relevance of the matter must be taken into consideration. The parties may also raise questions regarding the collection, preservation, chain of custody, examination, or interpretation of the evidence.

Stage Ten: Judicial Evaluation of Forensic Evidence

The journey of forensic evidence finally reaches its purpose when the Court evaluates its evidentiary value while deciding the case. At this step, the entire route of the evidence becomes relevant—from how it was recognized and gathered at the crime scene, to how it was stored, transported, analyzed, and presented before the Court.

Any weakness at an earlier stage may affect the value attached to the evidence at the final stage. Only when every step of this process is carefully managed and the evidence's integrity is preserved from the crime scene to the courtroom, then it can contribute to justice.

THE COURTROOM: HOW SHOULD FORENSIC EVIDENCE BE EVALUATED?

A forensic report does not bring the judicial process to an end. Instead, it gives the Court scientific material that must be carefully examined before it is relied upon.

The Court may consider questions such as:

1. Who conducted the forensic examination?
2. Was the person properly qualified?
3. What exactly was examined?
4. How was the sample collected?
5. Was it properly sealed and preserved?
6. Was the chain of custody properly maintained?
7. What method was used for the examination?
8. Was the method scientifically accepted and properly applied?
9. Was the possibility of contamination adequately addressed?
10. Does the expert's conclusion agree with the other evidence available in the case?

The Supreme Court's decision in *State of Himachal Pradesh v. Jai Lal*¹⁷ is important in this regard. The Court explained that expert evidence is mainly advisory in nature. An expert assists the Court by providing specialised scientific knowledge, but the final decision remains with the judge. The Court must independently examine the reliability of the expert's opinion along with the other evidence on record. Therefore, forensic evidence should not be viewed in either of two extreme ways. It should not be rejected simply because it involves technical or scientific concepts. At the same time, a forensic or laboratory report should not be treated as automatically conclusive.

¹⁷ *State of Himachal Pradesh v. Jail Lal*, (1999) 7 SCC 280: AIR 1999 SC 3318.

THE RIGHT TO FAIR TRIAL AND FORENSIC EVIDENCE

The accused must have a meaningful opportunity to understand and challenge the scientific evidence used against them. This becomes particularly important in cases involving complex forensic evidence because a scientific conclusion may appear highly authoritative, while its reliability depends on how the evidence was collected, examined, and interpreted.

For example, when a DNA report is relied upon, the defence may need information about:

1. The Original Sample;
2. The Method of Collection;
3. Laboratory Records;
4. The Testing Method Used;
5. Quality-Control Procedures;
6. Possible Contamination;
7. Interpretation of the Results;
8. Statistical Basis of The Conclusion;
9. Chain Of Custody; And
10. Qualifications of the Forensic Analyst.

The Supreme Court's decisions relating to DNA evidence show that scientific evidence is not beyond judicial scrutiny. In *Pattu Rajan v. State of Tamil Nadu*¹⁸, the Court recognised DNA evidence as opinion evidence and explained that its evidentiary value depends upon the circumstances and other evidence in the case.

Similarly, in *Manoj & Ors. v. State of Madhya Pradesh*¹⁹, the Court, when evaluating DNA evidence, the Supreme Court emphasized the significance of appropriate testing protocols and contamination prevention.

Therefore, as the use of forensic evidence increases under the modern criminal justice system, the safeguards available to the accused must also remain strong. Scientific investigation should help the Court discover the truth while ensuring that the accused receives a fair opportunity to examine and challenge the evidence relied upon against them.

DISTINCTION BETWEEN CRPC AND BNSS

The primary difference between the CrPC and the BNSS, with relation to forensic science, is not that forensic evidence was wholly missing under the CrPC. Forensic science was already

¹⁸ *Pattu Rajan v. State of Tamil Nadu*, (2019) 4 SCC 771.

¹⁹ *Manoj & Ors. v. State of Madhya Pradesh*, (2023) 2 SCC 353.

used for purposes such as DNA examination, medical examination, scientific analysis, and expert reports. However, the BNSS gives forensic investigation a more structured role in the investigation process. Because Section 176(3) of the BNSS mandates that a forensic expert visits the crime scene and permits videography of the evidence-collection procedure in applicable major offences, it is especially significant. This places greater emphasis on scientific examination from the earliest stage of investigation.

The BNSS also gives specific recognition to the custody of electronic devices through Section 193(3)(i)²⁰, which requires the police report to mention the sequence of custody of an electronic device. This is particularly relevant in the present digital age, where electronic evidence can easily be transferred, copied, altered, or deleted. Therefore, the shift from the CrPC to the BNSS can be understood as a move towards a more organised and technology-oriented approach to criminal investigation. The BNSS gives forensic examination a more prominent and organized role, especially at the crime scene and in the management of electronic evidence. This reflects the increasing importance of scientific methods in establishing facts and strengthening the reliability of criminal investigations.

However, the effectiveness of these provisions will depend not only on the statutory framework but also on their proper implementation. Trained forensic experts, adequate laboratories, proper chain-of-custody procedures, quality control, timely forensic reports, and sufficient State-level infrastructure are essential for achieving the purpose of these provisions.

Therefore, the real significance of the BNSS lies not merely in giving forensic science greater statutory recognition, but in creating a stronger connection between the crime scene, scientific examination, and the courtroom. The effectiveness of this approach will ultimately depend on whether forensic evidence is properly collected, scientifically examined, carefully documented, and fairly evaluated by the Court.

CHALLENGES DURING FORENSIC SCIENCE INVESTIGATIONS

CHALLENGE I: CRIME-SCENE CONTAMINATION AND IMPROPER COLLECTION

Maintaining the crime scene in its original state is the first significant issue in forensic inquiry. Numerous causes, such as the following, may cause the crime scene's condition to be disrupted or changed:

- A. Unnecessary Movement of Objects;
- B. Excessive Handling of Evidence;

²⁰ BNSS, § 193(3)(i).

- C. Entry Of Unauthorised Persons;
- D. Movement or Disturbance of the Body and Surrounding Material;
- E. Improper Packaging of Exhibits;
- F. Contact Between Different Items of Evidence; And
- G. Environmental Factors Such as Heat, Moisture, Dust, or Rain.

Biological evidence is particularly sensitive to contamination. In cases involving DNA evidence, even minor contamination can affect the reliability and interpretation of the scientific results. It may also create difficulties in determining whose biological material was actually detected at the crime scene.

The importance of preventing contamination is recognised not only in forensic practice but also in judicial proceedings. The Supreme Court has emphasised the need to maintain the quality and reliability of DNA testing and to take appropriate measures to minimise the possibility of contamination.

The BNSS, 2023 adopts a partly preventive approach to this issue. Section 176(3), seeks to improve the professional examination and documentation of the crime scene and the evidence found there.

However, legislation alone cannot completely prevent contamination. Effective crime-scene management also requires properly trained personnel, appropriate protective equipment, standard operating procedures, and careful handling and preservation of exhibits.

CHALLENGE II: CHAIN OF CUSTODY

The process may be broadly understood as:

- A. Crime Scene
- B. Investigating Officer
- C. Evidence Storage
- D. Transport
- E. FSL
- F. Forensic Analyst
- G. Court

At every stage, it should be possible to establish:

- A. What was collected?
- B. Who collected it?
- C. When was it collected?
- D. How was it sealed?

- E. Where was it stored?
- F. Who handled it?
- G. When was it sent to the laboratory?
- H. Was the seal intact when received?
- I. What examination was conducted?

The defense may contest the identification, validity, and integrity of the evidence if these queries are not adequately addressed.

This is not merely a procedural concern. The Supreme Court has recently considered whether the prosecution was able to prove an uninterrupted chain of custody and if the integrity of forensic materials had been appropriately preserved. In *Pooranmal v. State of Rajasthan*²¹ The Supreme Court emphasised how crucial it is to keep forensic samples in an appropriate chain of custody. The Court observed that before relying on an FSL or DNA report, the prosecution must show that the samples were properly collected, sealed, preserved, and safely transferred to the laboratory. It must also be established that the samples were not tampered with during this process. The case demonstrates that forensic evidence's dependability is not just dependent on laboratory-based scientific analysis. If the prosecution cannot satisfactorily establish this chain, the reliability of the forensic report may be questioned.

CHAIN OF CUSTODY UNDER THE BNSS

The BNSS has specifically recognised the importance of documenting the custody of electronic devices. Section 193(3)(i) requires the police report to include:

“The sequence of custody in case of electronic device.”

Bharatiya Nagarik Suraksha Sanhita, 2023, Section 193(3)(i). This provision is particularly significant because digital evidence can be copied, altered, transferred, or deleted without leaving obvious physical signs. However, an important legal issue remains. Section 193(3)(i) expressly refers to electronic devices and does not provide a similarly detailed, single statutory framework for every category of physical forensic evidence, such as blood samples, DNA swabs, weapons, and trace evidence.

Therefore, the integrity of physical evidence continues to depend significantly on departmental procedures, laboratory protocols, proper documentation, and general principles of evidence law. Further standardisation of procedures for the collection, storage, transportation, and examination of physical forensic evidence could therefore strengthen the forensic framework

²¹ *Pooranmal v. State of Rajasthan & Anr.*, INSC 217 (2026), 3 S.C.R. 314.

under the BNSS.

CHALLENGE III: FORENSIC INFRASTRUCTURE AND SHORTAGE OF EXPERTS

A major concern is whether India has sufficient forensic infrastructure and trained personnel to meet the increased demands created by the new criminal laws.

The government stated in December 2024 that India had thirty-two State Forensic Science Laboratories, ninety-seven Regional Forensic Science Laboratories, and seven Central Forensic Science Laboratories, located at Chandigarh, Delhi, Bhopal, Pune, Guwahati, Hyderabad, and Kolkata (oldest). The same Government response acknowledged the need for additional infrastructure to address shortages of trained personnel and the workload faced by forensic laboratories.

The Government has introduced several measures to expand forensic infrastructure. The National Forensic Infrastructure Enhancement Scheme (NFIES) has a total outlay of ₹2,254.43 crore²² for 2024–25 to 2028–29. The scheme provides for nine additional National Forensic Sciences University off-campus and seven additional Central Forensic Science Laboratories, along with the enhancement of the existing NFSU Delhi campus. Its objective is to address the shortage of trained forensic professionals and reduce laboratory pendency.

As per the Government's Rajya Sabha response dated 11 February 2026, five of the approved NFSU off-campus were operating from transit campuses. The Government also stated that one hundred fifty-four forensic experts were engaged contractually in the seven CFSLs during 2025–26 to ensure zero pendency. However, corresponding State FSL data was not maintained centrally. These developments show both progress and continuing challenges. At the same time, there remains a need for more trained personnel, laboratories, specialised facilities, and stronger State-level capacity. The absence of centrally maintained data on State FSL manpower and pendency also makes it difficult to obtain a complete national picture of the existing forensic workload.

CHALLENGE IV: FORENSIC LABORATORY BACKLOG AND DELAY

The expansion of mandatory forensic investigation may also create delays if the number of laboratories and trained experts is not sufficient to process the increased volume of forensic exhibits.

The government has acknowledged that there is a severe lack of qualified forensic personnel

²² Ministry of Home Affairs (Government of India).

and that mandated forensic investigation under the new criminal laws is expected to increase the burden of forensic laboratories.

The relationship can be understood as follows:

- A. More mandatory crime-scene examinations
- B. More forensic exhibits
- C. Greater laboratory workload
- D. Potential increase in pending cases
- E. Delay in forensic reports
- F. Delay in investigation and trial

Therefore, the issue cannot be addressed merely by requiring investigating officers to send a larger number of exhibits to forensic laboratories. The Government's ongoing measures, including the establishment of additional CFSLs, NFSU campuses, laboratory modernisation, and mobile forensic facilities, reflect the need to increase this processing capacity.

CHALLENGE V: RURAL–URBAN DISPARITY

Access to forensic facilities is not necessarily uniform across India.

A metropolitan city may have access to a State FSL, regional laboratories, trained forensic experts, and specialised facilities for areas such as DNA analysis and digital forensics. In contrast, a rural district may have to depend on mobile forensic units or transport evidence over considerable distances to reach an appropriate laboratory.

Section 176(3) of the BNSS, which mandates that a forensic expert visit the crime scene in relevant circumstances instead of just receiving the gathered material at the laboratory, makes this issue more crucial.

Government schemes have therefore placed increasing emphasis on mobile forensic facilities. In a February 2026 Rajya Sabha response, the Government stated that projects covering thirty States/Union Territories had been approved for Mobile Forensic Vans²³. Separate projects covering twenty-five States/Union Territories had also been approved for laboratory modernisation. Reducing the distance between distant crime sites and specialized forensic facilities can be greatly aided by mobile forensic units. They are closer to the spot where the evidence. However, the effectiveness of such units depends on the availability of trained personnel, appropriate equipment, regular maintenance, adequate training, and timely deployment. A mobile forensic van, by itself, cannot replace a properly functioning forensic

²³ Ministry of Home Affairs (Government of India).

system.

CHALLENGE VI: QUALITY CONTROL AND ACCREDITATION

The effectiveness of forensic investigation cannot be measured by the quantity of laboratories or equipment alone.

A laboratory may have modern equipment but may still face challenges relating to: Validated Scientific Methods; Standard Operating Procedures; Internal Quality Control; Proficiency Testing; Proper Documentation; Contamination Prevention; Calibration and Maintenance of Equipment; Trained Forensic Analysts; And Technical Review of Forensic Reports.

In its 2024 report on forensic science and human rights, the National Human Rights Commission listed a number of institutional issues that forensic labs must deal with, such as a lack of qualified staff, poor infrastructure, storage constraints, and flaws in quality control systems.

The Delhi Forensic Science Laboratory provides an example of a more developed quality-control framework. Its Quality Management Division states that the laboratory follows a quality management system based on ISO/IEC 17025:2017. This includes internal audits, technical procedures, method validation, corrective measures, and continuous improvement.

The broader lesson is that forensic evidence cannot be considered reliable merely because it is described as “forensic.” Its reliability depends on the entire process through which the evidence is collected, preserved, examined, interpreted, documented, and reported.

FINDINGS

The study looked at the function of forensic science under the BNSS, 2023 and discovered that, in addition to legal provisions, its efficacy depends on appropriate evidence management, sufficient infrastructure, scientific validity, and court inspection.

1. Section 176(3) of the BNSS is an important step towards making criminal investigations more scientific and evidence-based. It encourages the use of forensic science while investigating serious offences.
2. Forensic science should not completely replace the traditional methods of investigation. Instead, it should work alongside ordinary investigation methods. Section 176(3) aims to supplement the investigation of major offenses with scientific evidence.
3. The forensic process actually begins at the crime scene. The way evidence is identified, collected, sealed, maintained and transported is very important. Even if the laboratory

- conducts the test correctly, the result may become unreliable if the evidence was not properly handled before reaching the laboratory.
4. The chain of custody is an extremely important part of inquiry. Chain of custody means keeping a proper record of who collected, handled, transferred and examined the evidence. Even a precise laboratory test might not be enough if there is uncertainty about whether the sample was appropriately stored or if it is the same sample taken from the crime scene.
 5. Lack of proper infrastructure and trained manpower continues to be a major challenge. Government policy documents have also recognised problems such as shortage of trained forensic professionals and delays in forensic laboratories. Therefore, more forensic laboratories, equipment and trained personnel are required for effective implementation.
 6. Forensic evidence is very useful, but it is not always perfect or conclusive. Scientific evidence can have limitations or errors. Therefore, courts must carefully examine expert evidence and should not accept it as automatically conclusive simply because it uses scientific terms.
 7. Digital evidence, audiovisual recordings, electronic devices, electronic records and expert opinions are the pillars of the investigation as it shows transparency.
 8. Section 176(3) BNSS still require greater clarity. Although the provision creates a duty relating to forensic investigation, it does not clearly specify the same legal consequence for every instance of non-compliance. This leaves an important area for further judicial interpretation and legal development.
 9. According to the study, the Bharatiya Nagarik Suraksha Sanhita, 2023 signifies a substantial change in the function of forensic science in criminal investigations. The BNSS does not introduce forensic evidence, as scientific and expert evidence was already recognised under the earlier legal framework. This indicates a movement from merely permitting forensic evidence to integrating scientific investigation more directly into the investigation process.
 10. The examination of recent Supreme Court decisions, including *Pooranmal v. State of Rajasthan* and *Dashwanth v. State of Tamil Nadu*, demonstrates the importance of proper collection, sealing, preservation, transportation and chain of custody. If the prosecution is unable to prove the integrity of the sample used to create the report, a scientifically sound report may lose its evidential significance.

11. The research further finds that the BNSS creates a stronger statutory framework for forensic investigation but does not by itself provide a complete and uniform system for handling every category of forensic evidence.
12. Another important finding is that the success of mandatory forensic investigation depends upon institutional capacity. The effectiveness of Section 176(3) cannot be assessed only by the existence of a statutory requirement. It also depends upon the availability of trained forensic experts, adequately equipped laboratories, mobile forensic facilities, proper storage systems, quality-control mechanisms and timely forensic reports. Thus, the research establishes that forensic reform under the BNSS is not merely a legislative reform; it is also an infrastructural and administrative reform.
13. Finally, the research finds that the increasing use of forensic evidence strengthens the need for careful judicial scrutiny and fair-trial safeguards. Their reliability must be assessed in light of the methodology used, qualifications of the expert, integrity of the sample, chain of custody, possibility of contamination and other evidence on record. Therefore, the true change that the BNSS is considering is not just expanding the use of forensic science but also establishing a trustworthy connection between the crime scene, scientific analysis, and courtroom assessment.

CONCLUSION

The journey “from crime scene to courtroom” reflects the complete process through which forensic evidence becomes part of a criminal case. The role of forensic science does not begin when a forensic expert prepares a report. It begins much earlier, from the moment the police reach the crime scene and determine what needs to be protected, documented, and collected.

The BNSS, 2023 recognises the growing importance of scientific investigation. Because it aims to enhance the involvement of forensic experts in the investigation of specific serious offences, Section 176(3) is important. Instead of relying solely on the investigating officer's personal preference, forensic involvement in such circumstances is meant to play a significant role in the inquiry once the provision becomes operative in the relevant State. Other technological measures that assist this strategy are also included by the BNSS, such as requirements pertaining to scientific expert reports, audio-video recording of searches and seizures, recognition of electronic evidence, and documentation of the chain of possession of electronic equipment. Together, these provisions reflect a broader movement towards a more systematic and scientifically supported criminal investigation process.

However, the effectiveness of these legal provisions ultimately depends on their proper

implementation. The presence of a legal requirement alone cannot ensure reliable forensic evidence. If forensic teams are not available, a crime-scene examination may not be carried out effectively. Similarly, if the chain of custody of a sample is not properly maintained, its reliability may be questioned. Errors caused during the gathering or storage of evidence at the crime scene cannot be fixed, not even by a well-equipped forensic lab. A scientifically prepared report is also meaningful only when its basis can be understood, and its findings can be properly examined before the Court. The real shift, therefore, is not simply from traditional investigation to forensic investigation. It is in the direction of a criminal justice system where scientific evidence is meticulously gathered, appropriately stored, impartially analysed, and assessed by the court based on its dependability and evidentiary value. India has already taken steps towards strengthening forensic infrastructure, trained manpower, mobile forensic units, and specialised institutions. Initiatives such as the National Forensic Infrastructure Enhancement Scheme show that the need for stronger forensic capacity has been recognised. The next challenge is to ensure that infrastructure, trained personnel, proper procedures, and judicial standards develop alongside the statutory requirements.

Ultimately, the success of Section 176(3) should not be measured merely by whether forensic experts visit crime scenes. Whether or not the evidence gathered at the crime scene is brought to court with its identity, integrity, and scientific dependability intact will determine its true worth.