



INDIAN JOURNAL OF LEGAL REVIEW

VOLUME 5 AND ISSUE 13 OF 2025

INSTITUTE OF LEGAL EDUCATION



INDIAN JOURNAL OF LEGAL REVIEW

APIS – 3920 – 0001 | ISSN – 2583-2344

(Open Access Journal)

Journal's Home Page – <https://ijlr.iledu.in/>

Journal's Editorial Page – <https://ijlr.iledu.in/editorial-board/>

Volume 5 and Issue 13 of 2025 (Access Full Issue on – <https://ijlr.iledu.in/volume-5-and-issue-13-of-2025/>)

Publisher

Prasanna S,

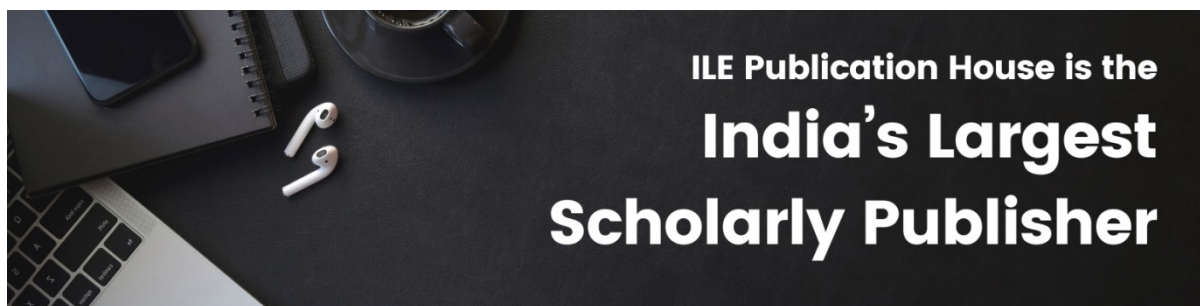
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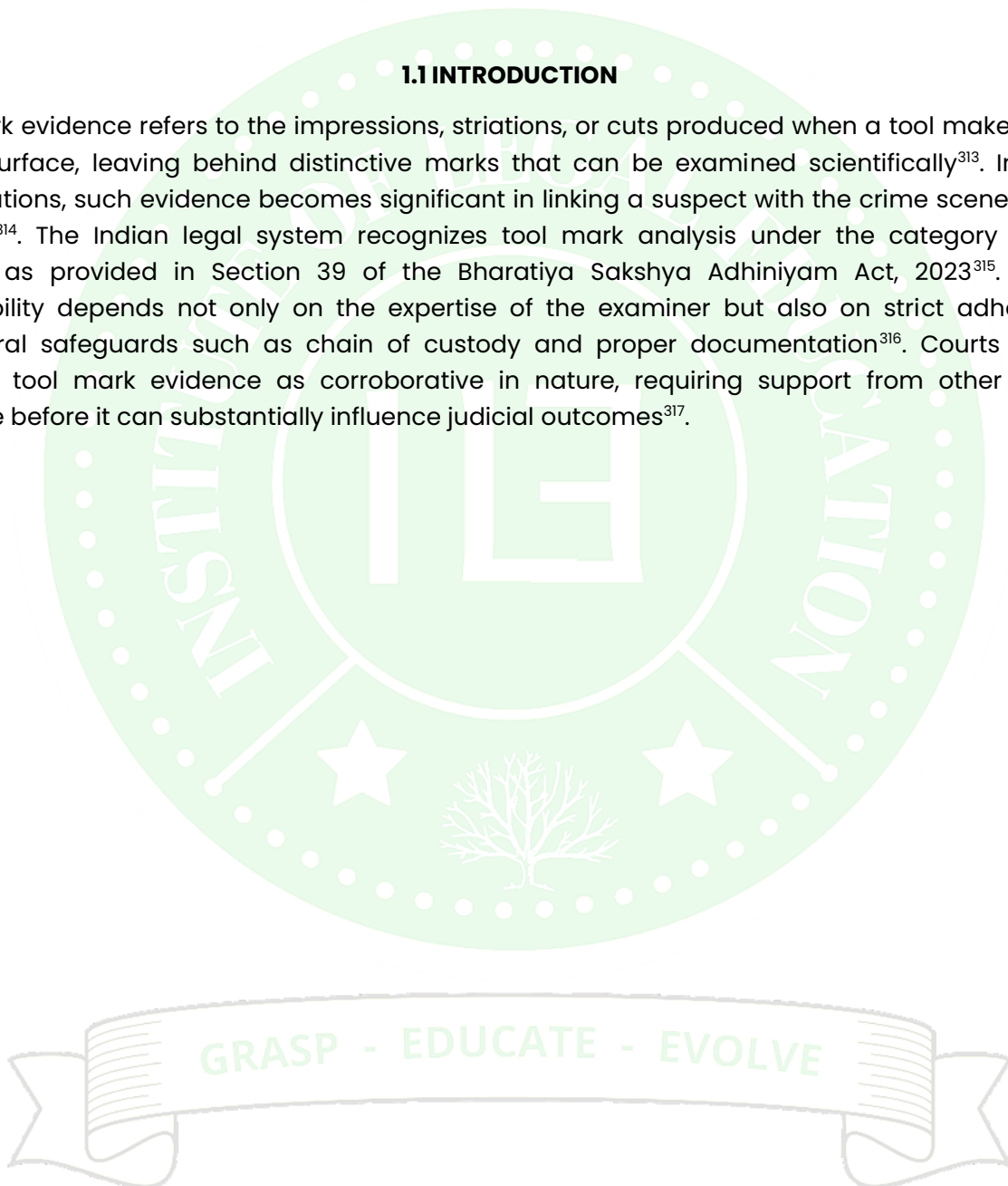
LEGAL CONSIDERATION AND ADMISSIBILITY OF TOOL MARKS EVIDENCE

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BEST CITATION – MONALISHA R A, LEGAL CONSIDERATION AND ADMISSIBILITY OF TOOL MARKS EVIDENCE, *INDIAN JOURNAL OF LEGAL REVIEW (IJLR)*, 5 (13) OF 2025, PG. 171-181, APIS – 3920 – 0001 & ISSN – 2583-2344.

1.1 INTRODUCTION

Tool mark evidence refers to the impressions, striations, or cuts produced when a tool makes contact with a surface, leaving behind distinctive marks that can be examined scientifically³¹³. In forensic investigations, such evidence becomes significant in linking a suspect with the crime scene or object involved³¹⁴. The Indian legal system recognizes tool mark analysis under the category of expert opinion, as provided in Section 39 of the Bharatiya Sakshya Adhiniyam Act, 2023³¹⁵. However, admissibility depends not only on the expertise of the examiner but also on strict adherence to procedural safeguards such as chain of custody and proper documentation³¹⁶. Courts generally consider tool mark evidence as corroborative in nature, requiring support from other forms of evidence before it can substantially influence judicial outcomes³¹⁷.



³¹³ Saferstein, Richard, *Criminalistics: An Introduction to Forensic Science*, 12th ed. (Pearson, 2017) p. 278.

³¹⁴ Inman, Keith & Rudin, Norah, *Principles and Practice of Criminalistics: The Profession of Forensic Science* (CRC Press, 2001) p. 143.

³¹⁵ Section 39 of BSA Act, 2023

³¹⁶ Sharma, B.R., *Forensic Science in Criminal Investigation and Trials*, 6th ed. (Universal Law Publishing, 2017) p. 512.

³¹⁷ *State of Maharashtra v. Damu*, (2000) 6 SCC 269.

1.2 OBJECTIVES OF THE STUDY

1. To understand the scientific basis of tool mark evidence.
2. To examine the legal provisions governing its admissibility in India.
3. To analyse judicial decisions on the use of tool mark evidence in criminal trials.
4. To identify challenges and suggest measures for strengthening its evidentiary value.

1.3 REVIEW OF LITERATURE

1. B.R. Sharma emphasizes the significance of forensic science in criminal investigations and the role of expert testimony under Section 39 of the BSA Act, noting that tool mark evidence is generally corroborative in Indian courts³¹⁸.
2. Chandra & Sharma³¹⁹ highlight the importance of proper collection, preservation, and presentation of forensic evidence, including tool marks, for ensuring admissibility in Indian legal proceedings.
3. Srishti³²⁰ discusses the growing role of forensic science in India and the challenges in integrating tool mark analysis into the judicial process.
4. Dumfries explains the criteria for relevancy and admissibility of tool mark evidence under the Indian Evidence Act, stressing expert opinions and procedural compliance³²¹.
5. Maurya & Mishra critically analyse the evidentiary value of tool mark evidence

in India and propose measures to enhance its credibility in criminal trial³²².

1.4 STATEMENT OF PROBLEM

In doctrinal research on tool mark evidence, the primary issue lies in examining the existing legal framework and judicial interpretations governing its admissibility in India. While forensic science provides methods to link tools to crime scenes, courts frequently rely on such evidence only as corroborative, and inconsistencies exist in its treatment across cases³²³. Procedural deficiencies in collection, preservation, and expert evaluation further complicate its acceptance in court.³²⁴ There is also a lack of standardized legal guidelines and comprehensive doctrinal analysis addressing the evidentiary weight of tool mark evidence under the Indian Evidence Act, 1872.³²⁵ This study seeks to critically analyse these legal provisions and judicial approaches to propose doctrinal clarity and strengthen its admissibility in Indian criminal trials.

1.5 RESEARCH QUESTIONS

1. What are the legal provisions under the Bharatiya Sakshya Adhiniyam Act, 2023 governing the admissibility of tool mark evidence?
2. How have Indian courts interpreted and applied expert testimony regarding tool mark evidence in criminal trials?
3. What procedural and evidentiary challenges affect the reliability and acceptance of tool mark evidence in India?
4. How can legal analysis contribute to clarifying the evidentiary value and standards for tool mark evidence?

³¹⁸ B.R. Sharma, *Forensic Science in Criminal Investigation and Trials* 512 (6th ed., Universal Law Publishing 2017).

³¹⁹ Gaurav Chandra & Ranjana Sharma, *Admissibility of Forensic Evidence in Investigations* (2023).

³²⁰ Srishti, *The Impact of Forensic Science on the Legal System in India* (2025).

³²¹ Ethan Dumfries, *Forensic Evidence – Relevancy and Admissibility under the Indian Evidence Act* (2025).

³²² Manvi Maurya & Dr. Srijan Mishra, *Evidentiary Value and Admissibility of Forensic Evidence* (2025).

³²³ B.R. Sharma, *Forensic Science in Criminal Investigation and Trials* 512 (6th ed., Universal Law Publishing 2017).

³²⁴ Gaurav Chandra & Ranjana Sharma, *Admissibility of Forensic Evidence in Investigations* (2023).

³²⁵ Manvi Maurya & Dr. Srijan Mishra, *Evidentiary Value and Admissibility of Forensic Evidence* (2025).

1.6 RESEARCH HYPOTHESIS

1. Proper collection, preservation, and analysis of tool mark evidence significantly increase its reliability and admissibility in Indian criminal courts.
2. Expert testimony based on scientifically validated methods enhances the evidentiary value of tool mark evidence in judicial proceedings.
3. Procedural lapses in handling tool mark evidence reduce its credibility and may lead to challenges or rejection in court.
4. Standardized legal and forensic guidelines can strengthen the consistent acceptance of tool mark evidence in criminal trials.

1.7 RESEARCH GAP

Although tool mark evidence is important in criminal investigations, there is a lack of comprehensive legal analysis in India regarding its admissibility and evidentiary value. Courts often show inconsistency in accepting such evidence, and there is limited guidance on standardized procedures for its collection, preservation, and expert evaluation. Additionally, advancements in forensic technology, such as 3D imaging and digital comparison, are not fully integrated or consistently recognized in Indian judicial practice. This study aims to address these gaps by examining the legal provisions, judicial interpretations, and procedural practices to enhance the reliability and acceptance of tool mark evidence in Indian criminal trials.

1.8 RESEARCH METHODOLOGY

This study adopts a doctrinal legal research approach, focusing on the analysis of statutes, judicial decisions, and scholarly writings related to tool mark evidence in India. Primary sources include the Bharatiya Sakshya Adhiniyam Act, 2023, and reported case laws where tool mark evidence was discussed. Secondary sources comprise books, articles, and journals on forensic science and criminal law. The research

involves critical examination and interpretation of these sources to understand the admissibility, reliability, and evidentiary value of tool mark evidence. Comparative references to international practices are included where relevant to highlight best practices and procedural standards. The study is entirely based on library and document-based research, without empirical or experimental investigation.

1.9 SCOPE AND LIMITATIONS

This study focuses on the legal framework and judicial interpretations regarding the admissibility of tool mark evidence under the Bharatiya Sakshya Adhiniyam Act, 2023, examining the role of expert testimony, procedural safeguards, and challenges in collection, preservation, and analysis. Comparative practices from other jurisdictions are considered to suggest improvements for the Indian context. However, the research is limited to published statutes, case laws, and scholarly writings, without conducting any experimental or laboratory analysis of tool marks. It also does not cover other types of forensic evidence in detail, and regional variations or recent unpublished cases may not be fully represented.

1.10 SCHEME OF THE STUDY

The dissertation is structured into five chapters.

Chapter 1 provides an introduction to the study, including the research problem, objectives, research questions, hypotheses, scope, limitations, and methodology.

Chapter 2 examines the statutory framework for tool mark evidence, focusing on relevant provisions of the Bharatiya Sakshya Adhiniyam Act, 2023 and other applicable laws.

Chapter 3 analyses the judicial approach to tool mark evidence in India, highlighting key case laws and court interpretations regarding admissibility and evidentiary value.

Chapter 4 discusses the legal issues and challenges associated with tool mark evidence,

including procedural lapses, reliability concerns, and the integration of forensic advances.

Chapter 5 presents suggestions and conclusions, summarizing findings, addressing gaps, and offering recommendations to strengthen the use and credibility of tool mark evidence in Indian criminal trials.

2 LEGISLATIVE PROVISIONS PERTAINING TO THE ADMISSIBILITY AND LEGAL RECOGNITION OF TOOL MARK EVIDENCE IN INDIA

2.1 THE BHARATIYA SAKSHYA ADHINIYAM ACT, 2023

Tool mark evidence is an important form of forensic proof used to establish a link between a suspect, the instrument, and the crime scene. In India, its admissibility and legal recognition are primarily governed by the Indian Evidence Act, 1872 (now the Bharatiya Sakshya Adhiniyam Act, 2023). Section 39 of the BSA Act empowers courts to rely on expert opinions for interpreting scientific, technical, or specialized evidence, including tool mark analysis³²⁶. Section 40 of the act provides for the examination of experts in court³²⁷, while Sections 44 to 46, outline the manner of presenting expert evidence and its weight in judicial proceedings³²⁸. Proper application of these provisions ensures that tool mark evidence is considered credible and relevant during trials.

2.2 THE BHARATIYA NAGARIK SURAKSHA SANHITA ACT, 2023

The Bharatiya Nagarik Suraksha Sanhita Act, 2023 (BNSS Act) complements the Indian Evidence Act by providing procedural guidelines for the collection, seizure, and preservation of evidence, including tool marks, at crime scenes. Sections 21, 51, and 185 empower investigating officers to examine places, seize objects, and collect evidence relevant to an offence³²⁹. Proper adherence to these provisions ensures that tool mark evidence is legally obtained, maintaining its integrity and admissibility in

court. Furthermore, Section 176 of the act outlines the procedure for police investigation. If an officer suspects an offense, they must report it to a Magistrate and investigate. Section 176 also introduces a forensic mandate for serious offenses punishable by imprisonment of seven years or more, requiring forensic evidence collection at the crime scene by an expert to enhance evidence integrity.

Furthermore, Sections 193 and 194 deal with the submission of investigation reports and inquests, which may include expert findings and documentation of tool mark evidence³³⁰. The BNSS Act, thus provides essential procedural safeguards to uphold the reliability and evidentiary value of tool mark evidence in criminal trials.

2.3 THE ARMS ACT, 1959

The Arms Act, 1959 provides the substantive legal framework for regulating arms and ammunition in India, which often form the basis for tool mark evidence in criminal cases. Offences involving firearms frequently require forensic examination of weapons, bullets, and cartridge cases to establish a connection between the weapon and the crime scene. Sections 25 and 27 of the Act prescribe penalties for the illegal possession and use of firearms, making tool mark analysis critical for proving such offences³³¹. Forensic experts rely on microscopic examination of striations and impressions left by firearms, which are then presented as tool mark evidence in court to support prosecution under the Act³³². Thus, the Arms Act, 1959 directly reinforces the importance of tool mark evidence in establishing guilt in firearm-related offences.

2.4 THE EXPLOSIVES ACT, 1884 AND THE EXPLOSIVE SUBSTANCE ACT, 1908

The Explosive Substances Act, 1908 governs the regulation, control, and punishment of offences involving explosive materials in India. In cases

³²⁶ The BSA Act, 2023 section 39

³²⁷ Ibid, section 40

³²⁸ Ibid, section 44 to 46

³²⁹ The BNSS Act, 2023 §§ 21, 51, 185

³³⁰ The BNSS Act, 2023 §§ 193, 194.

³³¹ The Arms Act, 1959, §§ 25, 27.

³³² See generally K.S. Narayan Reddy & O.P. Murty, *The Essentials of Forensic Medicine and Toxicology* 527–531 (34th ed. 2017).

where explosives are used for criminal acts such as bombings or sabotage, forensic experts often rely on tool mark analysis to identify instruments used in assembling or triggering explosive devices. Sections 3 to 5 of the Act prescribe severe penalties for causing explosions, attempting to cause explosions, or unlawfully possessing explosive substances³³³. Tool mark evidence, such as impressions on detonators, wires, or containers, becomes vital in linking suspects with the handling and preparation of explosive devices³³⁴. Courts, therefore, recognize the role of such forensic findings as an important evidentiary aid in prosecuting offences under the Explosive Substances Act.

2.5 FACTORIES ACT, 1948

The Factories Act, 1948 is primarily aimed at regulating the health, safety, and welfare of workers in industrial establishments. Though not a criminal law statute like the Evidence Act or CrPC, it is relevant in cases where accidents or offences involve the use of industrial tools and machinery. Sections 21 to 41 of the Act prescribe safety provisions related to machinery, handling of tools, and prevention of workplace hazards³³⁵. In instances of workplace accidents or suspected sabotage, tool mark evidence may be examined to determine whether a machine or tool was tampered with, improperly maintained, or deliberately altered³³⁶. Such forensic analysis can assist in establishing liability of employers or identifying criminal negligence, thereby supporting prosecutions under the Factories Act.

2.6 THE CUSTOMS ACT, 1962

The Customs Act, 1962 provides the framework for regulating the import and export of goods, including arms, ammunition, and prohibited materials. Tool mark evidence becomes relevant in cases involving tampering of

containers, concealment of contraband, or illegal import of firearms and explosive devices. Sections 111 and 113 of the Act deal with confiscation of improperly imported or exported goods, while Section 135 prescribes penalties for fraudulent evasion of customs duties and smuggling offences³³⁷. Forensic examination of locks, seals, or containers may reveal tool marks that link suspects to the unlawful act of tampering or smuggling³³⁸. Such findings help establish the chain of events and support prosecutions under the Customs Act, particularly in cases involving prohibited arms or explosives.

2.7 THE NARCOTIC DRUGS AND PSYCHOTROPIC SUBSTANCES, 1985

The Narcotic Drugs and Psychotropic Substances Act, 1985 provides stringent measures for the control and regulation of narcotic drugs and psychotropic substances. Tool mark evidence becomes relevant in NDPS cases where concealment, packaging, or tampering of containers, vehicles, or equipment is involved. Sections 42 and 43 empower authorized officers to search, seize, and arrest in connection with narcotic offences³³⁹, while Section 52A governs the procedure for seizure and disposal of narcotic drugs and related articles³⁴⁰. Forensic experts may analyse impressions on locks, seals, or packaging materials to establish tampering or illegal handling, thereby linking the accused to the offence. Such tool mark analysis strengthens the evidentiary foundation of prosecutions under the NDPS Act by corroborating seizure records and investigative findings.

2.8 RELEVANCE OF EXPERT OPINION IN CRIMINAL PROCEEDINGS WITH RESPECT TO TOOL MARK EVIDENCE

Expert opinion forms the cornerstone for the admissibility of tool mark evidence in criminal cases. Since such evidence involves technical

³³³ The Explosive Substances Act, 1908, §§ 3–5.

³³⁴ See B.R. Sharma, *Forensic Science in Criminal Investigation and Trials* 412–415 (5th ed. 2019).

³³⁵ The Factories Act, 1948, §§ 21–41.

³³⁶ See K. Kumud & S.K. Shukla, *Labour and Industrial Laws* 233–236 (8th ed. 2020).

³³⁷ The Customs Act, 1962, §§ 111, 113, 135.

³³⁸ See B.R. Sharma, *Forensic Science in Criminal Investigation and Trials* 468–472 (5th ed. 2019).

³³⁹ The Narcotic Drugs and Psychotropic Substances Act, 1985, §§ 42–43.

³⁴⁰ The Narcotic Drugs and Psychotropic Substances Act, 1985, § 52A.

analysis beyond the understanding of a layperson, courts rely on forensic experts to interpret the marks left by tools on objects or surfaces. The Bharatiya Sakshya Adhiniyam Act, 2023, under Section 39, expressly recognizes the relevance of expert testimony when the Court must decide issues requiring scientific or technical knowledge³⁴¹. Tool mark comparison, which generally involves microscopic study of striations, impressions, and unique characteristics, is a specialized task and falls within this statutory mandate.

The value of expert opinion, however, is advisory and not conclusive. Courts have repeatedly held that while scientific opinion is relevant, it must be weighed with other facts and circumstances in the case³⁴². In *Ram Chandra v. State of U.P.*, the Supreme Court observed that expert evidence is only an opinion and cannot by itself form the sole basis of conviction unless it is corroborated by other reliable material³⁴³. Similarly, in *State of H.P. v. Jai Lal*, the Court emphasized that an expert must demonstrate a reliable scientific process for the opinion to have evidentiary weight³⁴⁴.

In matters involving firearms, burglary implements, or tampered locks, expert opinion regarding tool marks provides the crucial scientific link connecting the instrument to the crime. The probative value of such evidence depends not only on the competence of the expert but also on strict adherence to proper collection, preservation, and chain of custody procedures. Thus, expert testimony ensures that tool mark evidence, when scientifically valid and corroborated, enhances the reliability of criminal adjudication.

3 JUDICIAL APPROACH TO TOOL MARKS EVIDENCE

Indian courts have increasingly acknowledged the evidentiary value of tool mark analysis in criminal trials, especially in offences involving

firearms, burglary implements, and tampered locks or containers. Judicial interpretation has emphasized two consistent principles: first, that expert opinion under Section 39 of the BSA Act, 2023 is relevant and admissible³⁴⁵, and second, that such opinion must be weighed carefully with other material on record.

The Supreme Court in *Ram Chandra v. State of U.P.* held that expert testimony, including forensic opinions, is not conclusive but merely advisory, and therefore requires corroboration through independent evidence before forming the basis of conviction³⁴⁶. Likewise, in *State of H.P. v. Jai Lal*, the Court clarified that expert evidence must rest on demonstrable scientific reasoning rather than bare assertion, ensuring that the opinion inspires confidence in judicial evaluation³⁴⁷. These observations apply directly to tool mark cases, where forensic experts are expected to explain the process of comparison and establish the scientific reliability of their conclusions.

In firearm-related prosecutions, the courts have often relied on ballistic and tool mark evidence to link weapons with spent cartridges or bullets. For instance, in *Mohd. Aman v. State of Rajasthan*, the Court upheld reliance on ballistic examination where the expert demonstrated consistency between the seized firearm and recovered cartridges³⁴⁸. At the same time, courts have cautioned that improper handling, gaps in the chain of custody, or unverified laboratory methods can reduce the weight of such evidence³⁴⁹.

Overall, the judicial approach reflects a cautious but supportive stance. Tool mark evidence is treated as a valuable piece of circumstantial proof, but its reliability depends on strict adherence to forensic procedures and corroboration with other evidence presented in trial.

³⁴¹The BSA Act, 2023 sec 39

³⁴²See generally *Murari Lal v. State of M.P.*, (1980) 1 SCC 704 (India).

³⁴³*Ram Chandra v. State of U.P.*, AIR 1957 SC 381 (India).

³⁴⁴*State of H.P. v. Jai Lal*, (1999) 7 SCC 280 (India).

³⁴⁵Section 39 of the BSA Act, 2023

³⁴⁶*Ram Chandra v. State of U.P.*, AIR 1957 SC 381 (India).

³⁴⁷*State of H.P. v. Jai Lal*, (1999) 7 SCC 280 (India).

³⁴⁸*Mohd. Aman v. State of Rajasthan*, (1997) 10 SCC 44 (India).

³⁴⁹*Murari Lal v. State of M.P.*, (1980) 1 SCC 704 (India).

3.1 INDIAN CASE LAWS ON ADMISSIBILITY AND RELIANCE ON EXPERT TESTIMONY

In Indian criminal jurisprudence, expert testimony has been consistently recognized as a relevant form of evidence, particularly in cases involving technical or scientific issues. The Bharatiya Sakshya Adhiniyam Act, 2023 under section 39, permits courts to consider opinions of persons with specialized knowledge in science, art, or technical subjects when such expertise is necessary for judicial determination³⁵⁰.

In *Ram Chandra v. State of U.P.*, the Supreme Court observed that expert evidence is advisory and cannot form the sole basis of conviction. Courts must weigh expert opinion alongside other corroborative evidence before reaching a conclusion³⁵¹. Similarly, in *State of H.P. v. Jai Lal*, the Court emphasized that experts must explain the scientific methods they use, and the reliability of their opinion depends on proper methodology and adherence to recognized procedures³⁵².

In *Murari Lal v. State of M.P.*, the Court highlighted that while expert evidence is relevant, it cannot override direct or circumstantial evidence. The credibility of expert testimony depends on factors such as qualifications, experience, and the rigor of the scientific process followed³⁵³. The Supreme Court in *Mohd. Aman v. State of Rajasthan* further upheld that ballistic and tool mark evidence could form a reliable part of the prosecution's case if corroborated with proper procedural documentation and scientific reasoning³⁵⁴.

In *Ramesh Chandra Agrawal v. Regency Hospital Ltd*³⁵⁵, The Supreme Court emphasized that an expert's role is to assist the court by providing specialized knowledge. The expert's opinion is not binding but is advisory in nature.

The court must evaluate the expert's qualifications, methodology, and the facts upon which the opinion is based before relying on it.

In *Kabul Singh v. Gurinder Singh*, in this case, the Punjab and Haryana High Court held that an expert should confine their opinion to the specific question posed. Offering opinions on matters not inquired about can render the expert's testimony inadmissible. The court underscored the importance of relevance and specificity in expert testimony³⁵⁶.

In *Suhas Katti v. Tamil Nadu*, 2004 Cri LJ 4311 (Mad HC), This landmark case involved the admissibility of electronic evidence under Section 63 of the BSA Act. The court accepted the testimony of a private techno-legal consultant as an expert, validating the role of non-governmental experts in electronic evidence cases. This case set a precedent for the acceptance of electronic evidence without the need for original documents³⁵⁷.

In *State of Maharashtra v. Damu* (2000) 6 SCC 269, The Supreme Court reiterated that expert opinions are admissible under Section 39 of the BSA Act. However, the court must ensure that the expert's opinion is based on sound scientific principles and is relevant to the issues at hand³⁵⁸.

In *State of Rajasthan v. Kashi Ram*, (2006) 12 SCC 254, The Supreme Court upheld the admissibility of ballistic expert testimony linking a firearm to a crime. The court emphasized that such expert opinions are crucial in establishing the connection between the weapon and the offence, provided the methodology is scientifically valid³⁵⁹.

In *State of Punjab v. Gurmit Singh*, (1996) 2 SCC 384, In this case, the Supreme Court discussed

³⁵⁶ (2005) 3 SCC 212

³⁵⁷ *Suhas Katti v. Tamil Nadu*, 2004 Cri LJ 4311 (Mad HC)

³⁵⁸ *State of Maharashtra v. Damu* (2000) 6 SCC 269

³⁵⁹ *State of Rajasthan v. Kashi Ram*, (2006) 12 SCC 254

³⁵⁰ The BSA Act, 2023 sec 39

³⁵¹ *Ram Chandra v. State of U.P.*, AIR 1957 SC 381 (India).

³⁵² *State of H.P. v. Jai Lal*, (1999) 7 SCC 280 (India).

³⁵³ *Murari Lal v. State of M.P.*, (1980) 1 SCC 704 (India).

³⁵⁴ *Mohd. Aman v. State of Rajasthan*, (1997) 10 SCC 44 (India).

³⁵⁵ (2009) 9 SCC 283

the role of expert testimony in corroborating the prosecution's case. The court held that while expert opinions are valuable, they must be corroborated by other evidence to be relied upon for conviction.

These cases collectively demonstrate that Indian courts treat expert testimony as an important but advisory element of evidence. Its weight and reliability are assessed based on scientific validity, procedural compliance, and corroboration with other evidence, ensuring a balanced judicial approach.

3.2 JUDICIAL REASONING IN ACCEPTING / REJECTING THE TOOL MARKS EVIDENCE

Indian courts evaluate tool mark evidence with careful scrutiny, balancing its scientific value against procedural and evidentiary safeguards. The judicial reasoning generally focuses on three factors: credibility of expert testimony, procedural compliance during evidence collection and preservation, and corroboration with other evidence. Under Section 39 of the BSA Act courts may rely on expert opinions to interpret technical findings, but such testimony is advisory and not conclusive³⁶⁰.

Courts have rejected tool mark evidence when procedural lapses, such as improper collection, contamination, or breaks in the chain of custody, compromise its reliability. For example, in *Ram Chandra v. State of U.P.*, the Supreme Court held that expert testimony alone cannot form the basis of conviction unless supported by independent evidence³⁶¹. Similarly, *State of H.P. v. Jai Lal* emphasized that expert opinions must be based on sound scientific methodology and clearly explained to the court³⁶².

Conversely, judicial acceptance occurs when the expert follows rigorous scientific procedures, and the evidence is corroborated by other investigative findings. In *Mohd. Aman v. State of Rajasthan*, ballistic and tool mark evidence linking a firearm to a crime was upheld because

the methodology was reliable and supported by additional evidence³⁶³.

In sum, judicial reasoning ensures that tool mark evidence is considered credible only when collected and analysed scientifically, presented by a qualified expert, and corroborated with other material facts. This careful evaluation safeguards against misuse while allowing such evidence to play a crucial role in criminal adjudication.

4 LEGAL ISSUES AND CHALLENGES

4.1 ADMISSIBILITY V PROBATIVE VALUE

Admissibility means whether the tool mark evidence can be legally presented in court. Under Section 39 of the BSA Act, 2023 expert opinions on scientific matters, like tool marks, are admissible.

Probative value means how much the evidence helps prove a fact. Even if the evidence is admitted, its usefulness depends on the reliability of the expert, proper collection, and whether it is supported by other evidence.

For example, expert opinion may be admissible but not strong enough to prove guilt on its own. When the methods are reliable and the evidence is corroborated, it becomes both admissible and highly valuable to the case.

4.2 RELIABILITY AND SUBJECTIVITY OF EXPERT OPINION

Expert opinion is critical in interpreting tool mark evidence, but its value depends on reliability and the degree of subjectivity involved. Reliability refers to the consistency and scientific accuracy of the expert's methods. Courts expect experts to follow established forensic procedures, maintain the chain of custody, and apply validated scientific techniques to ensure that the findings are trustworthy.

However, tool mark analysis often involves a level of subjectivity because impressions can vary based on pressure, angle, or wear of the

³⁶⁰ The BSA Act, 2023 sec 39

³⁶¹ *Ram Chandra v. State of U.P.*, AIR 1957 SC 381 (India).

³⁶² *State of H.P. v. Jai Lal*, (1999) 7 SCC 280 (India).

³⁶³ *Mohd. Aman v. State of Rajasthan*, (1997) 10 SCC 44 (India).

instrument. Experts interpret these marks, and differences in experience or judgment can influence conclusions. Indian courts have emphasized that while expert opinion is relevant under Section 39 of the BSA Act, it is advisory and not binding, and must be corroborated with other evidence to strengthen its credibility.³⁶⁴

Cases such as *Ram Chandra v. State of U.P.* and *State of H.P. v. Jai Lal* illustrate that courts carefully scrutinize the reliability of expert opinions and may reject or assign limited weight to evidence if procedural lapses or subjective errors compromise its accuracy³⁶⁵. Proper training, adherence to scientific methods, and clear documentation help minimize subjectivity and enhance judicial confidence in expert testimony.

4.3 CHALLENGES IN CROSS-EXAMINATION OF EXPERTS

Cross-examination of expert witnesses in criminal trials, including those presenting tool mark evidence, presents unique challenges. Experts possess specialized scientific knowledge that is often beyond the understanding of a layperson, making it difficult for lawyers to effectively test the reliability and accuracy of their testimony.

One key challenge is technical complexity. Questions about microscopic analysis, tool impressions, or comparative techniques require a basic understanding of forensic science, which may not be possessed by the examining counsel. Another challenge is subjectivity and interpretation; experts may reach different conclusions based on the same marks, making it hard to challenge their opinions conclusively in court³⁶⁶.

Additionally, procedural issues such as incomplete documentation, gaps in the chain of custody, or unclear lab reports can complicate cross-examination. Lawyers must identify these weaknesses to question the credibility of the

expert effectively. Courts have emphasized that while expert evidence is valuable, it is advisory and must be corroborated with other material facts, making thorough cross-examination essential for ensuring fairness and accuracy in judicial proceedings³⁶⁷.

4.4 OVER-RELIANCE ON EXPERT TESTIMONY

While expert testimony plays a vital role in interpreting scientific evidence, courts have repeatedly cautioned against over-reliance on such opinions. Under Section 39 of the BSA Act, 2023, expert evidence is admissible, but it is only advisory in nature and cannot substitute for judicial reasoning.

The risk of over-reliance arises because judges and lawyers may lack technical knowledge and therefore place undue weight on the expert's conclusions. Tool mark evidence, in particular, carries an element of subjectivity, as different experts may interpret the same marks differently depending on methodology, experience, or laboratory standards³⁶⁸. This creates the danger that uncorroborated expert testimony could lead to wrongful convictions or acquittals.

The Supreme Court in *Ram Chandra v. State of U.P.* made it clear that expert opinion alone cannot be the sole basis of conviction without independent corroboration³⁶⁹. Similarly, in *Murari Lal v. State of M.P.*, the Court reiterated that while expert evidence is valuable, it must be supported by additional evidence to ensure reliability and fairness³⁷⁰.

Thus, courts strive to strike a balance: expert testimony is considered a valuable aid to justice but must always be weighed alongside other material evidence. Over-reliance without proper judicial scrutiny risks undermining both due process and the integrity of the criminal justice system.

³⁶⁴ *Murari Lal v. State of M.P.*, (1980) 1 SCC 704 (India).

³⁶⁵ *Ram Chandra v. State of U.P.*, AIR 1957 SC 381; *State of H.P. v. Jai Lal*, (1999) 7 SCC 280 (India).

³⁶⁶ *Ram Chandra v. State of U.P.*, AIR 1957 SC 381 (India).

³⁶⁷ *Murari Lal v. State of M.P.*, (1980) 1 SCC 704 (India).

³⁶⁸ *State of H.P. v. Jai Lal*, (1999) 7 SCC 280 (India).

³⁶⁹ *Ram Chandra v. State of U.P.*, AIR 1957 SC 381 (India).

³⁷⁰ *Murari Lal v. State of M.P.*, (1980) 1 SCC 704 (India).

4.5 CORROBORATIONS AND SAFEGUARDS

Courts in India have consistently stressed that expert opinion, including tool mark analysis, must be supported by corroborative evidence to gain credibility. Expert testimony under Section 39 of the BSA Act, 2023, is admissible but not conclusive; it is meant to assist the court rather than replace judicial reasoning. For this reason, corroboration with other forms of evidence such as eyewitness accounts, recovery of weapons, ballistic reports, or circumstantial facts, is considered essential to strengthen the evidentiary value of tool mark findings³⁷¹.

Safeguards are also necessary to ensure that tool mark evidence is reliable and legally acceptable. These include maintaining a strict chain of custody, following scientifically validated methods, and ensuring that experts are properly qualified and impartial. Courts have rejected evidence where such safeguards were absent, noting that procedural lapses can compromise both the admissibility and probative value of expert opinion³⁷². The Supreme Court in *Mohd. Aman v. State of Rajasthan*³⁷³ highlighted that forensic findings, when corroborated by other material evidence and backed by reliable scientific processes, can significantly strengthen the prosecution's case. Such judicial reasoning underscores the principle that corroboration and procedural safeguards act as vital checks, ensuring that tool mark evidence is not misapplied or over-relied upon in criminal adjudication.

5 SUGGESTIONS AND CONCLUSION

SUGGESTIONS

- ❖ **Standardization of Procedures** – Uniform forensic guidelines should be developed and followed across all laboratories in India to reduce subjectivity in tool mark analysis and improve consistency in results.

- ❖ **Capacity Building** – Continuous training and skill development programs for forensic experts and investigating officers are necessary to strengthen the accuracy and reliability of tool mark examinations.
- ❖ **Judicial Awareness** – Specialized training for judges and lawyers in scientific evidence can minimize over-reliance on expert opinion and enable better scrutiny during trials.
- ❖ **Strengthening Safeguards** – Ensuring strict chain of custody, proper documentation, and adherence to scientific protocols can enhance the probative value of tool mark evidence.
- ❖ **Interdisciplinary Collaboration** – Courts should encourage collaboration between forensic scientists, ballistic experts, and law enforcement to provide more comprehensive and corroborated evidence.

CONCLUSION

Tool mark evidence plays a crucial role in modern criminal investigations by linking weapons, instruments, or mechanical tools to criminal acts. Indian courts, while recognizing its importance under Section 39 of the BSA Act, have consistently emphasized that such expert testimony is only advisory in nature and must be supported by corroborative evidence. Judicial reasoning in accepting or rejecting tool mark evidence reflects a balanced approach, prioritizing scientific reliability, procedural safeguards, and fairness in adjudication.

The major challenges remain in the areas of subjectivity, over-reliance, and inconsistent forensic practices. Addressing these issues through procedural reforms, judicial training, and scientific advancements will not only strengthen the evidentiary value of tool mark analysis but also safeguard against wrongful convictions. Ultimately, the integration of reliable forensic science with robust legal safeguards ensures that tool mark evidence

³⁷¹ Ram Chandra v. State of U.P., AIR 1957 SC 381 (India).

³⁷² State of H.P. v. Jai Lal, (1999) 7 SCC 280 (India).

³⁷³ Mohd. Aman v. State of Rajasthan, (1997) 10 SCC 44 (India).

continues to serve as a valuable aid in delivering justice.

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