



OKLAHOMA STATE BUREAU OF INVESTIGATION

LATENT EVIDENCE UNIT

FOOTWEAR EXAMINATION TRAINING MANUAL

TABLE OF CONTENTS

- I. Scope
- II. New Employee General Training Manual (NETM)
- III. Introduction to and History of Footwear
- IV. Manufacturing of Footwear
- V. Terminology
- VI. Detection and Recovery of Impression Evidence
- VII. Enhancement of Impression Evidence
- VIII. Known Exemplars of Footwear
- IX. Comparison of Impression Evidence
- X. Case Management
- XI. Applicable Criminal and Civil Law and Procedures
- XII. Final Evaluation
- XIII. Technical/Administrative Reviews and Verifications
- XIV. Maintenance of Skills and Expertise
- XV. Approval
- XVI. History
- XVII. Attachments

OSBI LEU FW TMA 1 – Footwear Trainee Checklist

OSBI LEU FW TMA 2 – Footwear Mock Trial Evaluation Form

I. SCOPE

Each person employed by the OSBI Criminalistics Services Division will complete a documented training program. Each training program must emphasize and teach the skills and knowledge required to achieve the minimum standards of competence and good laboratory practice for each specific area. The objective of a training and development program is to provide highly qualified individuals to serve the Criminal Justice System.

The progress of the trainee will be documented on the LEU Trainee Checklist (OSBI LEU FW TMA 1) and in the form of a monthly training memo stating the training completed during the previous month. The person assigned to the training function will provide the monthly memo. The trainee will be required to meet certain academic and performance standards in order to complete the training program. The trainee will be required to score a minimum of 90% on all academic assignments. If minimum scores are not achieved, re-training will occur per QP19.

II. NEW EMPLOYEE GENERAL TRAINING MANUAL (NETM)

- A. If applicable, the trainee will complete the OSBI CSD New Employee General Training Manual. This manual covers the following sections of training:

- 1.0 Introduction
- 2.0 Orientation
- 3.0 Laboratory Safety, Security, and Administrative Procedures
- 4.0 Overview of Forensic Science
- 5.0 Quality Assurance
- 6.0 Ethics in Forensic Science
- 7.0 Forensics in the Courtroom

III. Introduction to and History of Footwear

- A. Impression evidence is generally defined as *“objects or materials that have retained the characteristics of other objects or materials through direct physical contact.”* By this definition, impression evidence can be left by a wide variety of objects. For the purposes of this training, impression evidence will be limited to footwear.
- B. The trainee will gain knowledge of the history of impression evidence as a means of identification.
- C. The trainee will refer to the following reading material:
- 1. Footwear Impression Evidence: Detection, Recovery and Examination, by William Bodziak, Chapter 1
 - 2. Forensic Footwear Evidence, by William Bodziak, Chapter 1

IV. Manufacturing of Footwear

Footwear are mass produced using different manufacturing processes, in a variety of designs and are used extensively in the population. Through daily wear and tear, additional randomly acquired markings are created. Combine these factors and it becomes possible to associate an impression to a particular footwear.

- A. The trainee will gain knowledge over the different types of manufacturing processes and understand the value of class characteristics, randomly acquired characteristics and wear patterns on shoe soles and impressions.
- B. The trainee will refer to the following reading material:
 - 1. Footwear Impression Evidence: Detection, Recovery and Examination, by William Bodziak, Chapter 7
 - 2. Forensic Footwear Evidence, by William Bodziak, Chapters 9-14
- C. The trainee will watch videos over the manufacturing process of footwear assigned by the trainer.
- D. The trainee will complete a written exam over the manufacturing process of shoes. A minimum score of 90% is required for successful completion.

V. Terminology

- A. The trainee will learn the terminology that is commonly used in the forensic recovery and examination of footwear impression evidence by reviewing the ASB Technical Report 097, "Terminology Used for Forensic Footwear and Tire Evidence". (click to locate [document](#))

VI. Detection and Recovery of Impression Evidence

When shoe soles contact other surfaces, the pattern of the tread may be transferred to the contacted surface or impressed into the surface. These impressions can be left in a variety of substrates such as but not limited to dust, mud, grease, paint, or bodily fluid. This makes impression evidence likely at a crime scene but possibly difficult to detect. Different lighting and photographic techniques are available to help detect impressions in both dry and wet substances. It is also possible to detect some wet impressions using chemical techniques which will be addressed during chemical enhancement training.

The next step is to recover and preserve the impression for analysis and comparison. Recovery can be challenging depending on whether the impression is wet or dry, on a collectable item such as tile or on a permanent object such as a driveway, two dimensional or three dimensional. Photography is critical to all recovery and preservation efforts followed by casting and or lifting techniques.

- A. To gain knowledge over detection and recovery of impression evidence, the trainee will refer to the following reading material:
 - 1. Books
 - a. Footwear Impression Evidence: Detection, Recovery and Examination, by William Bodziak, Chapters 1-4
 - b. Forensic Footwear Evidence, by William Bodziak, Chapters 2-6

2. Guidelines: [ANSI/ASB](#) and [SWGDE](#) (click to locate documents)
 - a. ANSI/ASB Best Practice Recommendation 126, “Best Practice Recommendation for Casting Footwear and Tire Impression Evidence at the Crime Scene”
 - b. ANSI/ASB Best Practice Recommendation 049, “Best Practice Recommendation for Lifting of Footwear and Tire Impressions”
 - c. ANSI/ASB Best Practice Recommendation 050, “Best Practice Recommendation for Photographic Documentation of Footwear and Tire Impression Evidence”
 - d. ANSI/ASB Best Practice Recommendation 052, “Best Practice Recommendation for the Detection and Collection of Footwear and Tire Impression Evidence”
 - e. SWGDE – Scientific Working Group on Digital Evidence, “Guidelines for Digital Imaging of Footwear and Tire Impressions”
3. Procedures
 - a. OSBI LP-17: Lab Photography
 - b. OSBI LP-19: Electrostatic Lifting Device
 - c. OSBI LP-20: Lifting 2-Dimensional Impressions
 - d. OSBI LP-21: Casting 3-Dimensional Impressions
 - e. OSBI LP-22: Crime Scene Photography

B. Practical Exercises

1. The trainee will photograph 2D and 3D impressions in different substrates and environments in order to obtain both general and examination quality photos.
2. The trainee will recover impressions using the discussed techniques. The trainer will provide impressions that are suitable for the particular technique being used. The number of samples for each technique will be determined by the trainer depending on the performance of the trainee.
 - a. Castings
 - b. Electrostatic Lifting
 - c. Gel Lifts

- C. The trainee will complete a written exam over the detection and recovery of impression evidence. A minimum score of 90% is required for successful completion.

VII. Enhancement of Impression Evidence

Some impressions may be obvious to the unaided eye while others may be very faint or not seen at all. Detection and enhancement of these faint impressions with chemical treatments may cause them to become of sufficient quality to allow comparison to suspected footwear. The chemical techniques discussed here are most often used to detect and enhance impressions in blood. Images of impression evidence can be further enhanced with the use of Adobe Photoshop.

- A. The trainee will refer to the following reading material:
1. Books
 - a. Footwear Impression Evidence: Detection, Recovery and Examination, by William Bodziak, Chapter 5
 - b. Forensic Footwear Evidence, by William Bodziak, Chapter 7
 2. Guidelines/Standards (click to locate [document](#))
 - a. SWGTREAD Standard, "Guide for the Chemical Enhancement of Bloody Footwear and Tire Impression Evidence"
 3. Procedures
 - a. OSBI LP-06: Ninhydrin
 - b. OSBI LP-10: Leuco Crystal Violet
 - c. OSBI LP-11: Amido Black
 - d. OSBI LP-12: Acid Yellow 7
 - e. OSBI LP-17: Lab Photography
 - f. OSBI LP-18: Digital Enhancement and Documentation
- B. Practical Exercises
1. The trainer will provide the trainee with several bloody impressions on different substrates to chemically enhance. Approximately two or more substrates per chemical enhancement technique will be provided. After the impressions are chemically enhanced, the trainee will digitally photograph the impressions according to LP-17. There should be enough impressions for multiple enhancements with each technique covered. Techniques covered should include the following:
 - a. Leuco Crystal Violet
 - b. Amido Black
 - c. Acid Yellow 7
 - d. Ninhydrin
 2. Adobe Photoshop:
 - a. The trainee will be taught how to enhance and document digital images of impression evidence utilizing Adobe Photoshop according to LP-18.
 - b. For further instruction, the trainee will refer to Photoshop CS3 for Forensics Professionals by George Reis.
 - c. The trainee will utilize Adobe Photoshop to enhance the photographs captured during the practical exercises.
- C. The trainee will complete a written exam over chemical enhancement and digital enhancement of impression evidence. A minimum score of 90% is required for successful completion.

VIII. Known Exemplars of Footwear

Comparison of an evidence impression to a shoe can be difficult. A visual examination cannot show how a feature or characteristic within a shoe will appear in an impression. Test prints of suspected shoes are made to compare to the recovered evidence impression.

A. The trainee will refer to the following reading material:

1. Books
 - a. Footwear Impression Evidence: Detection, Recovery and Examination, by William Bodziak, Chapter 8
 - b. Forensic Footwear Evidence, by William Bodziak, Chapter 15
2. Guidelines: [ANSI/ASB](#) (click to locate document)
 - a. ANSI/ASB Best Practice Recommendation 021, "Best Practices for the Preparation of Test Impressions from Footwear and Tires"
3. Procedures
 - a. OSBI LEU Quality Manual and Procedures, Footwear Collection and Examination Standard Operating Procedures

B. Practical Exercises

1. The trainer will provide the trainee with four or more types of shoes (athletic, dress shoes, boots, etc.) which will be used to produce test prints. The items should have several randomly acquired characteristics that are reproducible for evaluation purposes.
2. The trainee will produce and evaluate the test prints. Observations made by the trainee should be documented for further evaluation by the trainer.
 - a. Multiple techniques should be used for each type of shoe (powder, ink, biofoam, etc.)
 - b. Duplicate test prints should be made for each technique used
3. The trainee and the trainer will compare the test prints created and discuss the differences observed between techniques and evaluate their advantages and disadvantages.

C. The trainee will complete a written exam over the collection of known exemplars. A minimum score of 90% is required for successful completion.

IX. Comparison of Impression Evidence

Even though footwear is mass-produced, there are a finite number of shoes that share the class characteristics of a specified size and design. Each of these items becomes exposed to damage that cannot be exactly reproduced from one item to the other. This damage, known as randomly acquired characteristics, can be used to identify a particular shoe print as being made from one shoe.

A. The trainee will refer to the following reading material:

1. Books
 - a. Footwear Impression Evidence: Detection, Recovery and Examination, by William

Bodziak, Chapters 9-11

b. Forensic Footwear Evidence, by William Bodziak, Chapter 16

2. Guidelines/Standards: [ANSI/ASB](#) and [SWGTHREAD](#) (click to locate documents)
 - a. SWGTREAD Standard, "Guide for the Examination of Footwear and Tire Impression Evidence"
 - b. SWGTREAD Standard, "Range of Conclusions Standard for Footwear and Tire Impression Examinations"
 - c. SWGTREAD Standard, "Guide for Casework Documentation"
 - d. ANSI/ASB Standard 137, "Standard for Examination and Documentation of Footwear and Tire Impression Evidence",
3. Procedures
 - a. OSBI LEU Quality Manual and Procedures, Footwear Collection and Examination Standard Operating Procedures

B. Practical Exercises

1. The trainer will provide questioned impressions and known items for comparison, conclusions will include:
 - a. Association
 - b. Identification
 - c. Exclusion
 2. The trainee will demonstrate proper documentation of the comparison along with appropriate conclusion statements for the samples provided.
 3. The trainer will evaluate the documentation and conclusion statements and discuss recommendations and/or corrections if required.
 4. The trainee will complete a minimum of 20 comparison exercises that include 2D and 3D footwear impressions.
 - a. The trainer shall ensure that the trainee has completed sets that represent casework type samples.
 - b. The sets should include multiple collection types (casts, photos, lifts, etc.), substrates (paper, glass, tile, wood, etc.), and matrix types (blood, mud, dirt, etc.).
 - c. Additional exercises may be assigned at the discretion of the trainer and/or technical manager.
- C. The trainee will complete a written exam over the comparison of impression evidence. A minimum score of 90% is required for successful completion.

X. Case Management

A. Review OSBI CSD Quality System

Certain policies within the OSBI CSD Quality Manual apply directly to casework. The trainee and his/her trainer will review the appropriate policies that govern certain aspects of casework.

B. Overview of Case Workflow

The trainer will explain the step-by-step process of being assigned a case to reporting the results. Different types of cases will require different steps. The trainee will be familiarized with the different types of cases he/she may encounter and the workflow for each type of case.

C. Evidence Handling

The trainer will explain evidence handling procedures for footwear examination. The trainee should be familiar with the OSBI Safety Policy regarding PPE. The trainee will be instructed on how to prepare an inventory of items. The trainee will be instructed on evidence storage procedures. The trainee will be instructed on creating derivative evidence. The trainee will be instructed on the proper routing of forensic testing for evidence that may be analyzed by another lab section.

D. Evidence Tracking System

This is the system by which the OSBI tracks the chain of custody of evidence while it is in the possession of the OSBI. The trainee will be instructed in the proper procedure for receipt of evidence, transfer of evidence, and release of evidence.

E. Documentation of Results

1. **Case Notes:** An examiner's case notes are a record of what evidence was analyzed, any developmental processes used on that evidence, and results of any analysis.
 - a. Case notes should be written in such a way that another examiner could read these notes and determine each examination activity conducted, the sequence of those activities, and the results of the activities.
 - b. The trainee will be instructed in the proper method for completing a case note form.
2. **Examination Report:** The examination report is the document containing the results of testing performed that is sent to the requesting agency, district attorney, and/or any other agency or person approved by OSBI policy.
 - a. The trainee will refer to Policies QP28 and QP33 of the OSBI CSD Quality Manual for further instruction in the format, content, style, and distribution of examination reports.

F. Other Case File Forms

1. Depending on the type of case, additional case file forms may be required. Some examples of these forms are: Photo-Log, Crime Scene Memo, Crime Scene Checklist, etc.

G. Administrative and Technical Review

1. The administrative and technical review process assists to ensure the quality of work.
2. The trainee will be instructed on the process of reviewing casework.
3. For further instruction, the trainee will refer to Policy QP31 of the OSBI CSD Quality Manual and the LEU Quality Manual and Procedures.

H. Mock Cases

1. The trainee will complete a minimum of ten mock cases. More may be assigned at the discretion of the trainer and/or technical manager.

XI. Applicable Criminal and Civil Law and Procedures

A. Oklahoma State Statute §74-150.37, "Forensic Laboratory Accreditation Act"

B. The trainee will refer to the following reading material:

1. Footwear Impression Evidence: Detection, Recovery and Examination, by William Bodziak, Chapter 12
2. Forensic Footwear Evidence, by William Bodziak, Chapters 17 and 20
3. Footwear: The Missed Evidence, 3rd Edition, by Dwane Hilderbrand, Chapter 12
4. Forensic Evidence: Science and the Criminal Law, by Terrence Kiely, Chapters 1-2 and 7

C. Courtroom Testimony Preparation:

1. Testimony Training
The trainee will be instructed in the proper method for providing testimony in front of a judge and jury. The trainee will learn how to properly articulate their qualifications, expertise, and the results of their analysis.
2. Testimony Observation
If possible, the trainee will attend court and observe cases where impression evidence testimony will be given by an authorized examiner.
3. Formal Testimony Training
If possible, the trainee will attend continuing education courses dealing with the topic of Expert Witness Testimony.
4. Court Exhibit Preparation
Occasionally, an examiner will be requested to prepare a charted enlargement of the results of their analysis. The trainee will be instructed in the proper method for creating a charted enlargement and presenting it to a judge and jury.

XII. Final Evaluation

All personnel shall successfully complete a competency test prior to performing testing or tasks that create items that could be used for testing. If the trainee's performance in the competency test is unsatisfactory, retraining will occur in the areas deemed unsatisfactory. Refer to Policy QP19 of the OSBI CSD Quality Manual for information regarding re-training.

A. Competency Test

1. The trainee will complete an oral and/or written competency test to evaluate the trainee's knowledge of the technical aspects of impression evidence examination. The oral and/or written competency test will be administered by the trainee's supervisor, technical manager, and/or other designees. A score of 90% is required to pass this portion of the competency test. If the trainee does not score a minimum of 90% then re-training will occur per QP19.
2. The trainee will complete a practical competency test in the form of a mock case assigned in the BEAST consisting of a range of evidence items. The trainee will select and perform the proper collection and enhancement techniques on the evidence items in accordance with LEU protocols. The trainee will analyze the impressions and conduct the appropriate comparisons according to the LEU Quality Manual and Procedures. The trainee will document their analysis in a case note form and document their results in a report. The trainer and/or technical manager will review the case to confirm that the expected results were achieved. The trainer and/or technical manager will review the report to evaluate the trainee's ability to accurately and clearly convey testing results and the significance of the results. Successful completion of the practical competency test requires obtaining the expected results with no technical errors. If the trainee does not obtain the expected results or has a technical error, then re-training will occur per QP19.
3. Upon successful completion of the mock case, the trainee will prepare for, and undergo a mock trial. The trainee will be evaluated on appearance, demeanor, poise, correlation of response with case and report information, and the ability to communicate information in a way a jury could understand. Reviewers of the mock trial will complete the Footwear Mock Trial Evaluation Form (OSBI LEU FW TMA 2). A cumulative average score of Satisfactory (3) or above is required for successful completion.

For further information about competency tests, the trainee will refer to Policy QP19 of the OSBI CSD Quality Manual.

XIII. Technical/Administrative Reviews and Verifications

After the completion of 3-5 footwear cases, if the analyst has had minimal Class II nonconforming work documented, they will begin training for conducting verifications, technical reviews, and administrative reviews. The analyst will review QP 31 of the OSBI CSD Quality Manual and Section

XIII of the LEU Quality Manual. An authorized examiner will train the analyst in how to conduct verifications, technical reviews, and administrative reviews. The trainee will observe an authorized examiner performing verifications, technical review, and administrative reviews. This training will be documented in a training memo. Once the analyst has demonstrated knowledge and understanding of this task, the Technical Manager will authorize the analyst to conduct independent verifications, technical reviews, and administrative reviews.

XIV. Maintenance of Skills and Expertise

The analysts of the LEU will maintain their skills and expertise by continually utilizing them while conducting casework. This will be tested annually through the completion of a proficiency test. The analysts of the LEU will also participate in continuing education as described in Policy QP19 of the OSBI CSD Quality Manual.

XV. APPROVAL

OSBI LEU Technical Manager: Stacy Hirschman 12/16/2025
Stacy Hirschman DATE

OSBI Criminalistics Quality Manager: Danielle Ross-Carr 12/16/25
Danielle Ross-Carr DATE

OSBI CSD Director: Janice Joslin 12/16/2025
Janice Joslin DATE

XVI. HISTORY

Rev #	Effective Date	History
00	12-31-2023	Reorganized Manual to include only Footwear Examination Training. Friction Ridge Examination Training and Crime Scene/Morgue Requests Training were moved to separate training documents. Updated the reading requirements with new ANSI/ASB Standards and the renumbered OSBI LEU Procedures. Reformatted to match formatting of LEU Quality Manual and Procedures. Created new attachment, FW TMA 1.
00		2024 Annual Review completed 12/31/24 with no modifications. (SH)
01	12-31-25	Incorporated suggestions [See Track Changes document].

XVII. ATTACHMENTS

Available in QMS:

- OSBI LEU FW TMA 1 – Footwear Trainee Checklist
- OSBI LEU FW TMA 2 – Footwear Mock Trial Evaluation Form