



## NSP CRIME LABORATORY CRIME LABORATORY MANUAL SHOE PRINT & TIRE TRACK



### I. Introduction

Criminal activity frequently leaves behind evidence of the culprit's identity in or around the crime scene. Footwear and tire impressions are frequently encountered forms of this evidence. This type of evidence may be found in or on many different types of material, such as paper, cardboard, dirt, mud, dust, blood, etc. The following guidelines are intended to assist in the collection, preservation and submission of such evidence to the Crime Laboratory.

### II. Examinations

Shoe and Tire Impression examinations involve the study of marks/impressions (manufacturing characteristics, imperfections, and unique damage characteristics) left behind by the outsoles of shoes and/or tire treads. Comparative analysis is performed in order to determine whether the marks correspond to other shoe/tire marks, to a particular brand/style of shoes/tires, or were made specifically by submitted shoes/tires as evidenced by correspondence of unique damage characteristics between impressions and their source.

#### A. Classifications of Shoe and Tire Impression Evidence:

1. Class characteristics - characteristics which are not unique, and are possessed by a group of shoes or tires as is intended by the manufacturer. Examples are:
  - a. Physical size.
  - b. Pattern design.
  - c. Repetitive manufacturing marks (due to the molding process).
2. Individual distinguishing characteristics - characteristics that are unique and individual to a particular shoe or tire. Examples are:
  - a. Wear characteristics (specialized and/or extreme wear patterns).
  - b. Random imperfections and damage characteristics (cuts, tears, nails, abrasions, etc.).

#### B. Possible conclusions in Shoe and Tire Impression examinations:

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1. **Identification** - Agreement of class characteristics and individual damage characteristics. The shoe print/tire impression was created by a specific shoe/tire. The chance of another shoe/tire making that same mark, with the same damage characteristics, is a practical impossibility.
2. **High degree of association** – Agreement of class characteristics and a limited number of individual damage characteristics and/or specialized wear. Association to a specific shoe/tire is compelling due to impression information that is more definitive than basic class characteristics, but still lacks in quality or quantity of damage characteristics to the extent an identification is not possible.
3. **Association of class characteristics** – basic class characteristics agree (tread design, physical size, and general wear), but there is a lack of identifying characteristics needed for a more definitive conclusion. Possible sources include any other shoes possessing the same class characteristics.
4. **Limited association of class characteristics** – some class characteristic detail is present, but impression is incomplete, pattern is lacking in clarity/quality/completeness, or cannot be assessed for physical size due to lack of scales. A meaningful conclusion cannot be reached due to one or a combination of these limiting factors.
5. **Indications of non-association** – characteristics of the impression lean towards elimination, but a lack of clarity or other impression data is not sufficient for an elimination.
6. **Exclusion** - The shoe print/tire impression was disassociated with the shoe/tire due to a disagreement of class characteristics and/or significantly different damage characteristics.
7. **Unsuitable** – The shoe print/tire impression has little detail or definition, preventing any assessment of class or individual characteristics.

### III. Collection and Preservation of Footwear and Tire Track Evidence

- A. Record location and photograph each item to be used for evidence.
  1. Use oblique lighting and some form of photographic scale, ruler, or tape measure (do not use random objects such as pens, coins, etc.).

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2. The camera lens needs to be perpendicular to the impression being photographed.
  3. Take at least four photographs with the oblique light coming from a different direction, close to the surface containing the impression.
    - a. Overhead lighting is fine to show an impression's overall placement within a scene, but will wash out detail needed for meaningful comparison.
  4. Ensure photo scales are at the same depth or plane as the impression. This may require digging out a small channel in mud, sand, or snow to place the scale at the proper depth.
  5. Photos must be taken from a stable platform (e.g. a tripod) to prevent loss of detail due to camera movement/vibration. Photos will be enlarged to see tiny details, so even the slightest movement can cause blur and distortion.
- B. If whole and/or partial impressions are found on small items such as paper or cardboard, carefully package the entire item. Use a suitable container for each item so the impression will not be smudged or damaged.
- C. Impressions on large items should be "boxed over" for the reasons stated above.
- D. Impressions in soft material should be cast only after proper photographs have been taken. If the casting process is not successful, the photos may be all that remains of the evidence impression. The investigator must be experienced in making plaster casts before attempting to do so on any evidence.
1. Be sure to protect all casts; use of wire or wire mesh is not necessary as long as cast is well supported/cushioned in handling, packaging, and transportation.
  2. Mark date, case number, and initials on the cast before it is removed. If cast has already hardened, a marker can be used.
  3. Package in a strong cardboard or wooden box. Cushion well with a suitable packing material.
  4. Do not clean casts. Damage to the cast may cause loss of crucial

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identification detail.

- E. Impressions on a hard flat surface should first be properly photographed, then collection can take place with the use of gel lifts, adhesive lifts, or an electrostatic dust print lifter. Ensure lifts are adequately protected to prevent loss of detail in transport.

#### IV. Collection and Preservation of Footwear or Tires

- A. Package immediately in separate containers to prevent loss or cross-contamination of trace material. Tires may not need the same care as footwear, unless trace material is present.
- B. Submit all shoes, boots or tires that require comparison.
- C. It is not advisable to make your own test marks with the shoes or boots that you submit for comparison. This is to be done in the Laboratory where care of such evidence can be controlled by an experienced examiner.
- D. Due to the difficult handling and transportation of suspect tires, tire exemplars may be obtained by submitting agencies and submitted in lieu of actual tires if the proper procedures are followed (ask Crime Lab staff for guidance). Information and photographs of the suspect tires will still be required even if the actual tires are not submitted. It may still be necessary to view the actual tires at a later date even if exemplars are sent to the Crime Lab.
- E. Failure to understand all variables critical to footwear/tire comparison can result in erroneous conclusions by untrained personnel. Do not conduct footwear/tire examinations unless proper training has been received in that area of analysis.

#### V. Submission of Footwear and Tire Track Evidence

- A. Due to the fragile nature of footwear and tire track evidence, it should be hand-carried to the Laboratory when possible. Although it can be mailed, extra care in its packaging is required. This Lab requires certified mail or another variation of tracked shipping to ensure proper chain of custody.
- B. Provide the Laboratory with any photographs that will assist in the examination. Complete the Evidence Submittal form (NSP 750).
- C. Make sure all evidence is properly packaged to prevent damage in transit.

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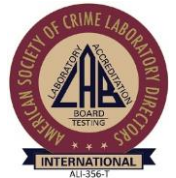
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- D. Seal all packages securely, and initial over the seal and onto the package.
- E. Do not hesitate to contact the Laboratory for assistance regarding any evidence problems/concerns.