Technical Procedure for Preservation of Footwear/Tire Tread Impressions

1.0 Purpose – This procedure is used in the preservation of questioned footwear/tire track impressions for comparison with known footwear/tire tread impressions.

2.0 Scope – This procedure applies to items of evidence that are to be examined for the presence of footwear and tire track impressions.

3.0 Definitions – N/A

4.0 Equipment, Materials and Reagents

4.1 Equipment and Materials

- Scale(s) (for determining correct size in photographs)
- Casting material (dental stone)
- Camera equipment with proper lighting

4.2 Reagents- N/A

5.0 Procedure

5.1 Application

5.1.1 Three-dimensional and two-dimensional impressions are customarily submitted for examination/comparison. Preservation of the impressions will differ depending upon the type of impression, the substrate and the receiving surface.

5.1.1.1 Two-dimensional dust impressions occur when a shoe or tire comes in contact with a surface heavily coated with loose material such as dust or dirt. The shoe or tire will strike the surface and the dust or dirt will cling to the sole or tread; a negative impression of the shoe or tire will remain.

5.1.1.2 Two-dimensional residue impressions occur as a result of residue being deposited from a shoe or tire to a surface. This will include impressions made by the transfer of ordinary residue which shoes accumulate, or impressions made after stepping in blood, grease, or other fluids.

5.1.1.3 Three-dimensional impressions occur when a shoe or tire comes in contact with a soft receiving surface. The impression is then impressed into the substrate (dirt, mud, etc). The resulting impression has a visible length, width and depth.

5.1.2 All questioned impressions shall be photographed prior to any other type of preservation method. The item shall be photographed using a digital camera, tripod, detachable flash and proper scale. Several photographs shall be taken with various light angles to ensure the best quality photograph of the impression is obtained. (See photographic equipment procedures.)

Note: All standards, lifts, photographs and casts created during the examination process shall be entered into FA as an item/sub-item of evidence.

5.2 Lifting Two-Dimensional Impressions

5.2.1 Identify the type of impression, including the type of substrate and the type of receiving surface.

5.2.2 Based on training and experience, choose the lifting material most suited to the substrate (gel/adhesive lifter, electrostatic lifter, etc.).

5.2.3 The Forensic Scientist shall date, initial and label the impression to identify the source for future reference.

5.2.4 Lift the impression using the proper technique for the type of lifter used (See Gelatin Lifters and Pathfinder).

Note: In some impressions, a sufficient amount of detail in the impression may not transfer to the lifting medium. Most impressions in blood, oil or other fluids (even in a dry stage) are fixed too well to the surface to adequately be lifted with any lift materials. In this case, photography is the only method to preserve the impressions.

5.3 Developing Impressions

5.3.1 For impressions that are in a substrate that is unable to be lifted (blood, grease, etc.) chemical enhancement methods may be used (see Blood Print Processing Techniques).

5.3.2 Prior to attempting an enhancement technique, the impression shall be photographed.

5.3.3 Once the impression has been developed, it shall be photographed using direct lighting and a scale prior to any attempts made at lifting.

Note: Some residue impressions may be enhanced for lifting by dusting them with fingerprint powder. Dust impressions should NEVER be dusted with fingerprint powder as this will likely destroy the impression.

5.3.4 If the impression is unable to be lifted, it shall be preserved through photography (see photographic equipment procedures) or by electronic recording (see Section Image Processing Procedure). See the above Processing Procedures for additional preservation information.

5.4 Casting Three-Dimensional Impressions

5.4.1 Three-dimensional impressions shall always be photographed using a tripod, scale and detachable flash prior to casting. Multiple photographs with various lighting angles and positions shall be taken to ensure that the maximum amount of impression detail has been captured.

5.4.2 Cast the impression using the proper casting technique (See dental stone casting).

5.5 Standards and Controls

5.5.1 The rulers/scales used in all impressions examinations (Footwear/Tire Tread) shall be verified annually by using Certified NIST Traceable rulers. The validation certificate shall be maintained by the Section Document Custodian.

5.6 Calibration – N/A

5.7 Sampling - N/A

5.8 Calculations – N/A

5.9 Uncertainty of Measurement – N/A

6.0 Limitations - N/A

7.0 Safety – N/A

8.0 References

Belcher, G.L. *Methods of Casting and Latent Print Recovery.*

Bodziak, W. "Use of Leuco Crystal Violet to Enhance Shoe Prints in Blood." *Forensic Science International.* (1996): 45-52.

Bodziak, W.J. *Footwear Impression Evidence.* CRC Press, New York (1990).

Bodziak, W.J. *Footwear Impression Evidence.* 2nd Edition. CRC Press, New York (2000).

Bodziak, W.J. *Lifting a Footwear Impression from a Hard Surface.* FBI Laboratory (April 1984).

Bodziak, W.J. *Casting a Footwear or Tire Impression with Dental Stone.*

Carlsson, K. and C.A. Maehly. For Securing Impressions of Shoes and Tyres on Different Surfaces. *International Criminal Police Review.* (June-July 1976): 158-167.

Davis, R.J. "Electrostatic Lifting." *Fingerprint Whorld.* (April 1984): 113.

Dinkins, L.S. *Development and Enhancement of Footwear Impressions on Non-Porous Surfaces Using Refrigeration and Cyanoacrylate Fuming.* U.S. Army Criminal Investigation Laboratory.

Freels, R.H. *Improved Test Impressions and Prints.* Kentucky State Police.

Geller, J. "Casting on Road Surfaces." *Journal of Forensic Identification.* Vol. 40, No. 5. 1990, pp. 279 – 282.

Geller, J. "Dental Stone Verses Plaster of Paris." *74th Annual Educational Conference*, IAI (June 1989): 1-4.

Hueske, E.E. *A Superior Method for Obtaining Test Prints from Footwear and Tires.*

Hueske, E.E. "Photographing and Casting Footwear/Tire Track Impressions in Snow." *Journal of Forensic Identification.* Vol. 41, 2: 92–95 (1991).

Journal of Forensic Identification. Vol. 41, 3: 165-167 (June 1991).

Majamaa, H. and E.D. Hamm. "Using the ESDA to Detect Dusty Shoe Prints." *Journal of Forensic Identification.* Vol. 41, 6: 421–425 (1991).

McDonald, P. *Tire Imprint Evidence.* CRC Press LLC, Florida (1993).

Navarro, R.L. *The Collection, Preservation, and Examination of Footwear and Tire Track Impressions.* (Aug. 1987).

Pasquier, Du E., et al. "Evaluation and Comparison of Casting Materials in Forensic Sciences Applications to Tool Marks and Foot/Shoe Impressions." *Forensic Science International.* (1996): 33-43.

Steigmann, J.P. *An Inexpensive Latent Fingerprint, Footprint, Shoeprint, and Tire Mark Lifter.*

"Tips on Making Casts of Shoe and Tire Prints." *FBI Law Enforcement Bulletin,* (Oct. 1963): 1-5.

Vandiver, J.V., and J.H. Wolcott. "Identification of Suitable Plaster for Crime-Scene Casting." *Journal of Forensic Sciences.* (1977): 607–614

Wolner, M.F. *Black Powder – Cotton Development of Latent Footwear Impressions.* Michigan State Police Laboratory.

9.0 Records – N/A

10.0 Attachments – N/A

Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	Original Document
05/22/2013	2	5.5.1- Verification of rulers/scales used in Footwear/Tire Tread cases
10/31/2013	3	Added issuing authority to header
04/07/2017	4	Header Update – Removed Digital reference.