



B32 Evaluation and Comparison of the Electrostatic Detection Apparatus and the Electrostatic Dust Print Lifter on the Development of Footwear Impressions on Paper

Christine L. Craig, MS, Seminole County Sheriff's Office, 100 Bush Boulevard, Sanford, FL 32733; Breanne Hornsby, BS, 12124 Knights Crossing Circle, #306, Orlando, FL 32817; and Matthew Riles, BS, 1823 Van Pelt Road, Sebring, FL 33870*

After attending this presentation, attendees will learn that the Electrostatic Detection Apparatus (ESDA) can be used to develop indented footwear impressions on paper; the attendee will learn the ESDA can be used in conjunction with the Electrostatic Dust Print lifter to obtain footwear impressions from paper; the attendee will learn which technique (the ESDA or the Electrostatic Dust Print Lifter) should be used to obtain the highest quality footwear impression; the attendee will also learn that if both techniques are used what order they should be used in to obtain the best footwear impression; and the attendee will also learn the ESDA will obtain footwear impressions on the top sheet of paper if a stack of papers are stepped on and the Electrostatic Dust Print Lifter lifts higher quality impressions as the amount of dust residue transferred to the surface decreases. This presentation will give the attendees new ideas and uses for the equipment they may have already or plan to purchase.

This presentation will impact the forensic science community and/or humanity by allowing the forensic science community to understand what equipment should be used to obtain the highest quality footwear impressions from paper evidence. Crime Scene and forensic laboratory personnel are always trying to obtain the best evidence possible. This presentation will give the forensic science community new ideas for developing footwear impressions on paper evidence and will give them a reference on which technique should be used. It will also show that if both techniques are used, what order they should be used in to obtain the best evidence. Therefore, this presentation will help the forensic community decide what techniques to use in order to obtain the highest quality footwear impression.

The Electrostatic Dust Print Lifter is commonly used to lift footwear impressions from paper. The Electrostatic Detection Apparatus (ESDA), traditionally used to enhance indented writing, can also be used to develop footwear impressions on paper. This research compared the two methods for developing footwear impressions on paper in order to determine if both processes could be used to develop footwear impressions of the same or similar quality and in what order they should be used to develop the highest quality footwear impression. The sensitivity of each technique was also evaluated. The quality of the footwear impressions developed was determined by comparing twenty-five individual characteristics present on the known shoe to the footwear impressions developed using each technique. These footwear impressions were made by stepping on paper placed over several different surfaces. These surfaces included: linoleum, industrial Berber carpet, nylon carpet placed over a 3/8-inch pad, ceramic tile, cardboard, 1-inch foam, 4-inch foam, cement, asphalt, grass, and mulch. Each of the papers placed on these surfaces were developed using the Electrostatic Dust Print Lifter before the ESDA and using the ESDA before the Electrostatic Dust Print Lifter. The sensitivity test for the ESDA was conducted by placing ten sheets of paper (stacked) onto a carpeted hallway. This stack of paper was then stepped on with the known shoe. Each piece of paper in the stack, beginning with the top sheet, was processed with the ESDA until no footwear impressions were developed. The sensitivity test for the Electrostatic Dust Print Lifter was conducted by placing ten sheets of paper along a carpeted hallway. Each sheet was stepped on with the known shoe in succession beginning with the first sheet. Each of these sheets was processed with the Electrostatic Dust Print Lifter and compared. This study determined the footwear impressions developed using only the Electrostatic Dust Print Lifter were of better comparative value than impressions developed with only the ESDA. On average, 72.4% of the individual characteristics from the known impression were identified on images developed when only the Electrostatic Dust Print Lifter was used compared to an average of 38.9% when only the ESDA was used. Therefore, if only one technique is used, the Electrostatic Dust Print Lifter should be chosen. This study also determined if both methods are used on a piece of evidence, the ESDA should be used first and the Electrostatic Dust Print Lifter should be used second. This order results in satisfactory impressions with the ESDA and the Electrostatic Dust Print Lifter compared to using the Electrostatic Dust Print Lifter before the ESDA, which results in very low quality images with the ESDA. On average, 45.5% of the individual characteristics were identified using the ESDA first and the Electrostatic Dust Print Lifter second compared to an average of 72.4% using the Electrostatic Dust Print Lifter first and the ESDA second. Therefore, if the choice is available, the Electrostatic Dust Print lifter should be used instead of the ESDA. Unfortunately, if the Electrostatic Dust Print lifter is used first and the ESDA second, the results obtained using the ESDA will be of very low quality. The sensitivity test determined the ESDA develops high quality footwear impressions only on the top sheet of paper if the papers were stacked when the impression was placed on the paper. No footwear impressions were developed on any sheets under the top sheet of paper. The sensitivity test also determined the Electrostatic Dust Print Lifter results increase in quality as the amount of dust residue decreases on the surface. Therefore, crime scene technicians should be particularly interested in the top sheets of paper on a surface and footwear impressions in trace amounts of dust residue. These types of footwear impressions will most likely result in higher quality impressions that retain the most individual characteristics.

Footwear Impression, Electrostatic Detection Apparatus, Electrostatic Dust Print Lifter