J32 ESDA Visualization of Marks Imparted by Postal Service Processing

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After attending this presentation, attendees will understand what types of indentations can be left by postal processing and how they may or may not differ from other indentations.

This presentation will impact the forensic science community by increasing understanding of all of the indentations found on document evidence, and being more informed as to the value of such markings.

Electrostatic Detection Apparatus (ESDA) examinations commonly reveal bands and/or lines on the documents being examined. Work done previously has established that the relative placement of some of those features corresponds to components in digital printing or photocopying processes (specifically, roller/feed mechanisms). A recent case at the Homeland Security Investigations–Forensic Laboratory (HSI-FL) involved numerous letters and envelopes, which were processed for indented handwriting using Foster & Freeman's ESDA-2. Only one of the documents actually had indented handwriting, and that writing appeared to have been made by administrative staff who had received the item. In addition to the indented writing, a variety of bands and lines were revealed in the ESDAs, the significance of which was initially unknown to the examiners involved. A review of professional meeting presentations and publications revealed the prior work about printer-generated marks.[1,2] Many of the marks in the case documents were consistent with the existing assessments of their likely sources. However, many of the items contain qualitatively different marks such as a wide band in the center of each half of the opened and flattened envelopes, and a wide band in the center of each third of the folded letters. It seems likely that those bands are artifacts of processing equipment used by the US Postal Service, since they had to have been created when the letters were inside the envelopes, and there are likely no other automated processes between sealing an envelope and its being sorted by the Postal Service's automated equipment in this particular case. Knowing that something is "likely" is not a sufficient understanding of the origin of these indentations and an analysis of the components of the processing equipment with an eye toward establishing what produces the wide band is required. Additionally, this type of analysis could reveal whether other Postal Service components could be producing other artifacts that would be revealed by an ESDA examination.

The experimental protocol includes preparing a number of test samples to include blank sheets of paper pulled from a common ream of paper, folding the sheets twice, and inserting them into addressed envelopes. A group of the samples are mailed from different locations using the United States Postal Service. Some samples from this group are mailed locally and some are mailed from the western United States, all of which arrive at the same location. Another group of samples is taken to the local Postal Service sorting facilities (including the regional Dulles sorting facility), and with the facility's permission, inserted into the sorting equipment to observe which specific mechanisms physically touch the samples in order to better understand what impressions are made. Finally, a third group of samples is used as a control. These samples are not exposed to any sorting equipment and are not put through the Postal Service at all. ESDAs are developed for all samples in each group and assessments are made as certain indentations are revealed.

This study is not meant to be exhaustive as it is not feasible to send mail through all Postal Service facilities. There are also countless combinations of equipment that a piece of mail can encounter, depending on the sending and receiving locations.

References:

1. Olson, Larry A. "Indentations Produced by the Document Feeder Mechanisms of Two Black and White Photocopiers." *Journal of the American Society of Questioned Document Examiners* Vol. 12 (2009): 1-18
2. Laporte, Gerald M. "The use of an electrostatic detection device to identify individual and class characteristics on documents produced by printers and copiers-A preliminary study." *Journal of Forensic Sciences* 49.3 (2004): 610-620.

Questioned Documents, Indentations, Postal Service

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