B88 Intra-Roll and Intra-Product Variations in Duct Tapes

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After attending this presentation, attendees will better understand the variation that can be expected within a single roll of duct tape as well as between rolls of those same tape products over time. This information may be used to better interpret the results of a comparative duct tape analysis and to assess the significance of those results.

This presentation will impact the forensic science community by increasing the knowledge of duct tape products, specifically the variation that can be observed/measured between tape products over an approximate six-month time frame (i.e., batch-level differences). The effect these results may have on association/discrimination criteria will be discussed.

Duct tapes are a type of trace evidence commonly encountered in North American forensic laboratories. Historically, the forensic community has relied on empirical observations, discussions with manufacturing representatives, and limited research studies to learn how and to what extent duct tape products vary. In order to provide a more robust understanding of duct tape variation, a two-part comprehensive study was devised.

Part 1 of this study examined how individual rolls of duct tape vary along both an individual roll's length as well as across a jumbo roll of duct tape. The jumbo roll analysis provided an evaluation of different rolls of the same product manufactured at the same point in time. It was determined that scrim count, width, thickness, and adhesive composition vary only to a limited extent along the length of an individual roll of tape. Further, aside from width, minimal variation in these characteristics occurs between different rolls cut from the same jumbo roll. Statistical analysis of the thickness and adhesive composition via Fourier Transform Infrared (FTIR) spectroscopy indicated that some statistically significant differences could be observed; however, these differences were minor and not meaningful in the context of the forensic examination of mass-produced products.

Following publication of those results, Part 2 of this study was undertaken in which the same manufacturers provided additional sample rolls of their most common products over an approximate six-month timeframe. Based on the results of Part 1, scrim count, width, thickness (both overall and film only), and adhesive composition (via FTIR) were further evaluated. Specifically, scrim count and width were measured to see whether any variation could be detected along the length of an individual roll, between rolls cut from the same jumbo roll, or between rolls produced at different points in time. Additionally, thickness and adhesive composition were evaluated to assess whether differences could be detected in these features between rolls produced at different times. When appropriate, multivariate statistical analyses were conducted on the data.

It is anticipated that the results of this study might be used to better define the association/discrimination criteria that should be used in comparative duct tape analyses. Further, an understanding of the variation over time can be used to determine whether forensic examiners can detect batch-level differences, which is important for interpreting the significance of an inability-to-discriminate result.

Duct Tape, Variation, Interpretation

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