A107 Discrimination of Architectural Paints via Physical and Chemical Methods of Analysis

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After attending this presentation, attendees will be aware of an ongoing FBI Laboratory project to assess the discriminating power of physical and chemical comparisons of architectural paints.

This presentation will impact the forensic community by providing a better understanding of the discriminating power of macroscopic, microscopic, and chemical analyses of architectural paints within the same general color classification.

Architectural paint samples are often submitted to crime laboratories as evidence associated with bank robberies, break-ins, or other violent crimes against persons. The FBI Laboratory performs comparative physical and chemical examinations to explore the possibility of an evidentiary link between a suspect's personal effects (e.g., clothing or tools) and one or more crime scene(s).

Submitted samples are first evaluated by visual and microscopic means to document physical characteristics. These include the surface layer's finish (glossy, matte, or eggshell), as well as the number, color, and relative thicknesses of each layer in the evidentiary specimens. Chemical analysis involves the use of Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM/EDS), and pyrolysis gas chromatography with mass spectral detection (pyGCMS).

This study involves the analysis and comparison of over 900 architectural paint samples utilizing the current FBI Laboratory protocol. Samples were collected and submitted by Laboratory and FBI field office personnel, as well as forensic scientists from a variety of law enforcement agencies within North America. Collection sites included interior and exterior surfaces at private homes, commercial buildings, and outdoor public dwellings such as park benches and tables. Therefore, the sample set represents architectural paints that could be easily accessed by average consumers and would be comparable to evidence commonly submitted to a forensic laboratory for analysis.

Samples were first separated into broad color categories (blue, red, green, brown/beige, yellow/peach, gray/black, and white) through visual and microscopic observations. Once all samples had been evaluated in this manner, an analyst conducted a pairwise comparison of each sample to all other samples within the same color designation. Samples that could not be discriminated were carried forward for chemical analysis and comparison.

The objectives of this project include: the determination of the range of physical and chemical characteristics associated with architectural paints, and assessment of the ability of the FBI Laboratory's overall analytical scheme to distinguish between samples. The analysis and discriminating power of the physical and chemical examination of non- white architectural paints will be the subject of this poster. Comparable assessments of white architectural paints will be the subject of future work.

Trace Evidence, Architectural Paint, Discrimination

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