Automotive Paint as Evidence in an Unusual “Hit and Run” Case.

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Abstract

This paper will present a case report concentrating on the analysis of paint as trace evidence. Paint transfers were observed on a variety of evidence items. Comparative analyses were conducted utilizing brightfield microscopy, Fourier-transform infrared spectroscopy, scanning electron microscopy with energy-dispersive x-ray spectroscopy, and visible microspectrophotometry. All of the paint transfers appeared to be similar to one another upon initial visual inspection. However, further microscopic and instrumental examinations revealed the presence of at least two different paint types.

Crime Scene Investigation

While on routine patrol in a local neighborhood, deputies were able to see through a gate into the backyard area of a residence whereupon they observed a group of male subjects gathered around a vehicle with its trunk lid open (Figures 1 and 2). The subjects dispersed in multiple directions when they saw the patrol car (the “RUN”).

Figure 1

Figure 2
Further investigation revealed a deceased male on the ground in the area behind the vehicle (Figures 3 and 4). The victim had been shot, stabbed, beaten, and doused with metallic blue-green paint (the “HIT”). Deputies called for assistance and over the next several hours, after scouring the neighborhood and utilizing K-9 units, a number of subjects were taken into custody.

Figure 3

Figure 4

The victim had apparently been killed in the shed adjacent to his observed position on the ground. Bloodstains in the shed were apparent as shown in Figures 5 and 6. Also present was a large quantity of metallic blue-green paint.

Figure 5

Figure 6
During the subsequent crime scene investigation, a variety of different items were collected representing different types of evidence such as bloodstains, paint, and beer bottles for prints and DNA. Items collected for paint analysis included different types of shoes, a gallon can of Dupont Nason automotive paint, and paint samples collected from the victim and from the hands of two suspects. Figures 7 through 12 show examples of some of the items submitted for analysis.

*Figure 7 - paint can in shed (Item 32)*  
*Figure 8 - paint on victim’s arm (SAS-3)*

*Figure 9 - paint on suspect’s hands*  
*Figure 10 - paint on shoe*
Laboratory Examination/Conclusions

Paint samples collected from evidence items were analyzed by brightfield microscopy, Fourier-transform infrared spectroscopy (FT-IR), scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM-EDX), and visible microspectrophotometry. The visual microscopic appearance of each of the examined paint samples was documented by photomicrography.

Initially, all of the paint samples appeared to be nearly the same color by a gross visual examination and comparison. However, by employing the various analytical techniques described, two different and distinguishable types of metallic blue-green alkyd enamels were found among the analyzed samples. Representative analytical results for each paint type are shown in Figure 15.
Figure 15 - Analytical results for the two types of paint (Item 32 and SAS-3)

Paint from can (Item 32)  Paint from victim (SAS-3)

Paint from can (Item 32)  Paint from victim (SAS-3)
Figure 15 cont’d - (Analytical data for Item 32 and SAS-3)

Paint from can (Item 32)  Paint from victim (SAS-3)

Paint from can (Item 32)  Paint from victim (SAS-3)
Figure 16 - Paint from shoe GH-08
Figure 16 cont’d - Analytical data for paint from shoe GH-08
Figure 15 shows a comparison photomicrograph of paint from the can (Item 32) and paint from the victim (SAS-3) taken at 200x with the samples mounted in Norland Optical Adhesive 61. Although both paints are alkyd enamels, they are easily distinguishable from one another. Note particularly the appearance and form of the 1389 peak and the 1452/1466 doublet, and also the peaks at 1210 and 1152 which are present in the paint from the can (Item 32) but are absent in the paint from the victim (SAS-3). Most of the examined paint samples in this case were characterized as one of these two paint types. In fact, a Nike Flight shoe identified as item GH-04 (see Figure 10) and a Swingman shoe identified as item SAS-5 bore both paint types as separate stains on different areas of each shoe.

The evaluation of the analytical data obtained from the shoes identified as GH-08 and GH-09 shown in Figures 13 and 14 was more challenging. Refer to Figure 16 for a summary of the analytical data of one of the samples from shoe GH-08. Several samples collected from both shoes gave results that were comparable to the results shown in Figure 16. The paint samples from these two shoes gave analytical results that suggested either of the following possibilities:

1. The samples may be a blend of paint from the paint can (Item 32) and paint from the victim (SAS-3), or

2. The samples are from a separate paint source that shares microscopic and chemical characteristics with paint from the paint can (Item 32) and paint from the victim (SAS-3).

Summary

In this case, the initial appearance of the evidence paint samples suggested they may have originated from one paint source. The combination of observed microscopic and chemical characteristics of the paint samples allowed those samples to be assigned to one of two paint types. A critical examination of all of the paint analytical data for one set of samples from a pair of shoes revealed the possibility of either a mixture of those two paint types, or the presence of a possible third paint source.