

Determination of the most effective enhancement process for latent fingermarks on Clydesdale Bank and Royal Bank of Scotland £5 and £10 polymer banknotes by Carina Anna Joannidis (SPA Forensic Services)

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This article reports the outcomes of an MSc project carried out in 2018 as part of a collaboration between the University of Strathclyde's Centre for Forensic Science and SPA Forensic Services Mark Enhancement Laboratory. The results were also published in *Forensic Science International* in 2020.

This project focused on the recovery of latent (invisible) fingerprints from Clydesdale Bank and Royal Bank of Scotland £10 and £5 polymer banknotes. These banknotes were released in Scotland in 2016 and 2017 following the release of similar polymer banknotes in other countries including Australia, Canada and England. This change in material from the old cotton notes was implemented predominantly to increase counterfeit resilience and durability. Every year, SPA Forensic Services examine millions of pounds worth of bank notes linked to criminal activity, the majority being Clydesdale Bank notes as the most common notes in circulation in Scotland.

Enhancement techniques used to recover latent fingerprints on cotton notes were favourable to materials with a porous surface, giving excellent results on these paper-like bank notes. However, the new polymer material is non-porous, rendering this old enhancement technique insufficient.

Five enhancement sequences, including different techniques and light sources, were tested to determine the most efficient method for recovering latent fingerprints on these bank notes. Techniques included superglue fuming, powder suspension, infrared and magnetic powders, with light sources including ultraviolet, infrared and white light. The study concluded that superglue fuming using PolyCyanoUV (an ultraviolet fluorescent glue substance)

followed by black magnetic powder was the most effective at enhancing latent fingerprints on the notes tested. Black iron oxide powder suspension was the second most effective technique. Visualisation of fingerprints was significantly increased when bank notes were photographed under infrared light (figure 1).

Following this initial study a mock case was set up to determine whether the two best enhancement sequences would be effective when applied to bank notes mimicking those seized in an investigation, and this second study corroborated the results of the first study. As a result of these invaluable findings, SPA Forensic Services have been able to implement these processes for use on money seized in criminal investigations.

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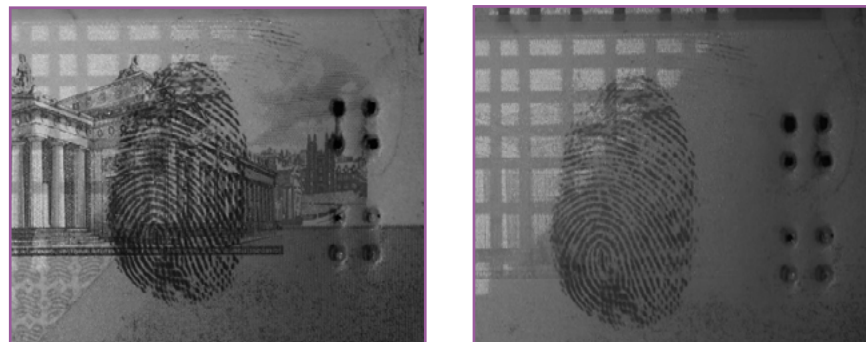


Figure 1. Fingerprint enhanced using black powder suspension, visualised under white light (left) and Infrared light (right).