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of three main parts, namely the application platform for shoeprint information collaborative searching, the database of shoeprint collected at crime scenes and the engine of pattern recognition, with the purpose of realizing the linkage of criminal cases quickly and precisely using shoeprint throughout the whole country. We would like to share our experiences in the construction and application of this system in this presentation.

KEYWORDS SHOEPRINT; LINKAGE OF CASES; APPLICATION SYSTEM

O 50-3

CHAINSAW TOOL MARK STRATIGRAPHY PATTERNS

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Theft of timber from private and public land occurs in the United States, Poland, Ukraine and other countries with woodlands. It is difficult to prevent illegal cutting of timber in large forested areas and absentee owners are more vulnerable to timber theft than on-site owners. The United States has approximately 750 million acres of woodlands and economists estimate that the theft of timber is a one billion dollar industry annually. It is estimated that 10% of the trees cut from national forests are from theft. Approximately 25,000 homes could be built annually from the amount of timber stolen in the United States alone.

When there is a report of stolen timber and a load of stolen logs recovered, the investigator can use chainsaw tool mark stratigraphy patterns on the logs to make preliminary matches between the recovered logs and the stumps in the forest. Chainsaw tool mark stratigraphy patterns occur when chainsaws are used to cut trees. When the person operating the chainsaw manipulates the saw, positions and re-positions the saw during the cutting process, a chainsaw tool mark pattern is created. As the chainsaw removes chips of wood from the tree, a series of linear striations create a pattern on each side of the cut section. Movement and positioning of the saw during the cut is indicative of the pattern produced. Finally, a conclusive match can be accomplished by comparing the tree rings.

In this study, to produce tool mark stratigraphy patterns, a chainsaw was used to cut 50 sections ~ 2-3 cm in thicknesses from a large Bradford Pear (Pyrus calleryana) branch 6-12 cm in diameter. The cut sections were juxtaposed and photographed using oblique lighting to visualize the patterns. Out of 50 sections examined, thirty-six sections (65%) contained sufficient tool mark striation patterns useful in matching the cut sections. Fourteen (35%) sections did not have sufficient tool mark striation patterns for matching purposes. The majority of sections that did not match were from the smaller diameter samples ~ 6 cm in diameter. In conclusion, the linear striation patterns produced by the chainsaw were useful in making preliminary matches of the cut samples. Therefore, examination of chainsaw tool mark stratigraphy patterns is recommended in timber theft investigations to determine preliminary matches.

KEYWORDS THEFT OF TIMBER; TOOL MARK PATTERNS; TREE RINGS

O 50-4

DETECTION OF RECENT HOLDING OF FIREARMS: IMPROVING THE SENSITIVITY OF THE PDT TEST

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Despite the significant improvement of the PDT test for detecting recent contact with firearms, there are still many occasions in which the modified reagent (FerrotraceTM) shows insufficient sensitivity. Two techniques have been devised and tested for the enhancement of the sensitivity of this process : exposure to water vapors, and accelerated sweating. Exposure of the hand to water vapors after spraying with the reagent significantly improved the quality of the colored impressions. The average increase was by 1 quality-grade (on an arbitrary scale of 4 grades). The technique is very simple and does not require any particular skill or equipment. Mechanistic aspects of the process are also discussed.

KEYWORDS FIREARMS; TRACE METAL DETECTION TEST (TMDT); FERROTRACE

O 50-5

COMPARATIVE STUDY ON THE DUST AND DRY RESIDUE FOOTWEAR IMPRESSION LIFTING EFFECTS OF DIFFERENT OBJECTS IN USING THE ELECTROSTATIC LIFTING