

Building the evidence jigsaw puzzle

by Senior Sergeant Darren Pobar, Physical Evidence Unit

Blood, hair, saliva and fibres are some of the types of physical evidence that scientific officers collect and analyse. Their aim is to use this evidence to link a suspect with a crime, or alternatively to prove the innocence of a person of interest.

Assisting police investigators in the detection, preservation, recording, collection and interpretation of physical evidence is the role of police officers from the Physical Evidence Unit (PEU).

PEU officers' work stems from attending major crime scenes including homicide, suspicious death, serious assault, extortion, drug plantation, rape scenes, fire and explosion scenes, and re-identified stolen vehicles.

To detect and enhance evidence found at crime scenes, PEU officers use various simple as well as complex physical and chemical techniques.

Physical detection techniques

A common and simple physical detection technique is the use of strong oblique lighting to search across flat surfaces such as floors and walls. This technique is useful in detecting otherwise non-visible shoe sole impressions, hairs, fibres and other trace material.

By using this oblique lighting technique shoe sole impressions, for example, are rendered visible and can be photographed to permanently record the impression. After the oblique light has made the impression visible, the impression can be taken from the surface using a gelatin lifting sheet, to use as further physical evidence.

Chemical detection techniques

Chemical detection methods used at crime scenes include possible positive tests for blood and semen. Two chemical methods used to detect or enhance blood are leucocrystal violet (LCV) reagent and luminol reagent.

LCV is useful to enhance shoe sole or foot impressions in blood and detect cleanup activities such as mop marks. LCV shows up small traces of blood in a dark purple colour.



Flourescent reaction... Luminol is one of the chemical detection methods used by officers to enhance possible positive tests for blood at crime scenes. When applied to blood it produces a flourescent reaction.

Luminol is a reagent which, when applied to blood, produces a fluorescent reaction. It will detect trace, non-visible amounts of blood. Luminol is useful for searching surfaces such as dark coloured carpets and for assisting the scene examiner to investigate new areas which otherwise may not have been a focus of the examination.

For example, a fluorescent trail down a hallway of a house may lead to a bedroom which appeared to otherwise show no visible signs of blood. While not confirmatory tests, they assist the evaluation of biological evidence at scenes.

Handy DNA samples

As DNA technology advances, PEU officers are often sampling commonly touched surfaces such as door handles for non-visible DNA called handy DNA. This DNA may be present in very small amounts and can be left by offenders at scenes without their knowledge. PEU officers use an alcohol swabbing technique to sample handy DNA.

Unusual evidence gathering techniques

Members of the PEU also conduct a number of laboratory examinations which include

the certification of cannabis sativa, physical fit and impression evidence comparisons, light bulb examinations and other trace evidence examinations.

One of the unusual laboratory examinations that PEU staff perform is physical fit comparison. A physical fit can be performed on any material that has randomly broken, torn or separated.

The examination is like completing a jigsaw puzzle. Pieces of similar material usually from different scenes are joined together. Materials such as broken headlights, pool cues, adhesive tape, a blade of a knife, radio hand strap, paint chips, beer bottles, pieces of wood, postpak boxes and sheets of plastic have been the subject of physical fit comparisons.

The PEU has an array of equipment and techniques to utilise during the physical evidence examinations to assist operational police with their investigations. The unit continually strives to keep abreast of the latest technology to provide the highest possible delivery of forensic science services to police, the courts and the community.