IT'S ALL IN THE DETAIL

Evidence collected and analysed at the scene of a crime can make or break a case. Here's how forensic teams go about their work.

By PETRO-ANNE VLOK & CHRISTIAAN BOONZAIE

The forensic team's crime scene manager (CSM) relieves the first member. The CSM takes control of and responsibility for the scene and assigns crime scene technicians and an investigating officer (IO).

Next is the planning phase. The CSM, crime scene technicians and IO take a “first walk” through the crime scene, noting possible routes used by the victim or perpetrator as well as spotting what can be collected as evidence. They must take care not to disturb any evidence.

The CSM decides which experts and forensic resources are needed and the order in which the scene should be investigated.

1. FIRST MEMBER

- When called out to a possible murder, the first police officer on the scene, called the first member, assesses if the victim is still alive. If so, the chief priority is to preserve life.
- If the victim is dead, the officer secures the crime scene using SAPS-identifying tape. Officers are stationed to prevent unauthorised access.

2. CRIME SCENE MANAGER

- The forensic department’s crime scene manager (CSM) relieves the first member. The CSM takes control of and responsibility for the scene and assigns crime scene technicians and an investigating officer (IO).
- Next is the planning phase. The CSM, crime scene technicians and IO take a “first walk” through the crime scene, noting possible routes used by the victim or perpetrator as well as spotting what can be collected as evidence. They must take care not to disturb any evidence.
- The CSM decides which experts and forensic resources are needed and the order in which the scene should be investigated.

3. PHOTOGRAPHER

- Before anyone may touch anything a photographer has to document the scene. Sometimes video documentation is also used or crime scene technicians make sketches.
- 3D total station scanners are relatively new and effective documenting tools which take 3D images of the scene.
4 CRIME SCENE TECHNICIANS

- They go through the scene with a fine-tooth comb. Because of the high crime rate in SA, crime scene technicians are often unavailable, so in this case the IO collects evidence.
- Technicians often use fluorescent light when searching for DNA samples. Blood, urine, semen and vomit show up in a bluish colour, even if the perpetrator tried to wash it off. UV light can help technicians see evidence hidden from the naked eye such as fingerprints, fibres and bruises on bodies.
- Technicians are expected to keep meticulous records and note the date, time and place where evidence was collected. Memory is fallible and wouldn’t hold up under cross-examination in court. Technicians have to label evidence as soon as they bag it.
- After evidence has been collected on and around the victim, the body is taken to the morgue for further investigation by a forensic pathologist. Bags are placed over the hands and feet to preserve potential DNA evidence under the nails.
- All collected evidence is preserved in evidence-collection kits and sent to the forensic science laboratory for analysis.

WHAT IS COLLECTED AS EVIDENCE?

TRACE EVIDENCE
- gunshot residue
- paint residue
- broken glass
- unknown chemicals

BODILY FLUIDS
- blood
- semen
- saliva
- vomit

IMPRESSIONS
- fingerprints
- footprints
- tool marks

HAIR AND FIBRES

WEAPONS AND FIREARMS
- knives
- guns
- bullet holes
- cartridge casings

DOCUMENTS AND DEVICES
- diaries
- suicide notes
- computers
- cellphones
- memory sticks

EVIDENCE SCALE
Before evidence is removed and sealed in evidence bags, it has to be photographed to scale. This allows the size of the object to be determined when the pictures are presented in court.
**WHERE EVIDENCE IS SENT**
Evidence collected at a crime scene is sent to various forensic laboratories for analysis. The SA Police Service has five laboratories, sub-divided into five units, says Arnold Greyling, managing director of Forensics DNA Consultants in Pretoria.

**BALLISTICS EXPERTS**
These specialists determine what firearm was used, where the shooter was when he pulled the trigger and the angles at which the shots were fired.
- Pistols discharge cartridges at different angles and distances, depending on their make. “For example, a Beretta discharges about two metres to the right,” Cobus Steyl of Forensic Ballistic Services says. “If you find an undisturbed cartridge on the scene, you can determine where the shooter stood.”
- If there are bullet holes or blood spatter, experts use a probe, string or a laser pointer to determine where and at which angle a shot was fired.

**BLOOD SPATTER ANALYSTS**
Blood spatter can tell you a lot about a crime and the type of weapon used.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Droplets</th>
<th>Less than 4 mm</th>
<th>Less than 1 mm</th>
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<tbody>
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<td>4-6 mm</td>
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| Low-velocity spatter usually occurs when a victim is stabbed and then moves around.
| Medium-velocity spatter suggests a blunt instrument such as a cricket bat or fist was used.
| High-velocity spatter resembles a fine mist and is usually caused by a gunshot. |

**FORENSIC ENTOMOLOGISTS**
“If a fresh body is dumped outside, it won’t take long for flies to find it and lay their eggs,” says Dr Sonja Brink of the department of zoology and entomology at the University of the Free State. Taking the temperature outside into account, the developmental stage of blowflies can tell you when a body was left outside, she adds.
- **Day 1** Blowflies are quick to descend on corpses and lay their eggs.
- **Day 2** Eggs hatch and larvae emerge.
- **Days 3 to 7** Larvae grow.
- **Days 8 to 9** They form a hard cocoons-like shell and develop adult features.
- **Two weeks** The adult fly emerges.
  “The timeline is based on a constant temperature of 21°C for a specific species of blowfly.”

**BACKLOG OF TESTS**
Between 1 April and 30 September 2012 the police’s forensic scientists received 299 431 samples for analysis. According to the minister of police, Nathi Mthethwa, most of these tests had been completed by November 2012.
  “The turnaround time for DNA tests in rape cases is usually about 30 days,” says Arnold Greyling, managing director of Forensics DNA Consultants in Pretoria.
  The backlog at the department of health’s laboratories is far greater.
  “Toxicological tests are far more complicated and there’s a backlog of several years,” Greyling says. “There’s a high staff turnover and the department frequently loses experts. It takes years to train replacements and it’s expensive.”
  He adds the backlog can’t be blamed just on the laboratories. “The way investigations are carried out as well as the justice system add to the delays.”