Detection of Accelerant Products in Motor Vehicle Arson: Background Study and Interpretation of Positive Results

By

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Certificate of Authorship and Originality

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of the requirements for a degree except as acknowledged within the text.

I certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. I certify that all information sources and literature used are indicated in the thesis.

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Karen.L.Cavanagh-Steer

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Publications and Presentations

Publications

Cavanagh K, Du Pasquier E and Lennard, C. *Background interference from car carpets the evidential value of of petrol residues in cases of suspected vehicle arson.* Forensic Science International (2002), 125(1), 22-36

Cavanagh K, Du Pasquier E, Roux C and Lennard C. *The Transfer and Persistence of Petrol on Car Carpets.* Forensic Science International (2005), 147(1), 71-79

Supervised Research

Hancock, M, *The Occurrence of Petrol on Car Boots.* Honours Thesis, UTS 2007. Supervised by Roux, C, Speers, N and Cavanagh-Steer, K

Conference Presentations

March 28 - April 2 2004 Wellington, New Zealand
The 17th International Symposium on the Forensic Sciences
• Awarded Best Poster in Section

Sept 22 – Sept 27 2003 Istanbul, Turkey
3rd European Academy of Forensic Science Triennial Meeting
• Workshop presenter

Sept 2 – Sept 27 2002 Montpellier, France
16th Meeting of the International Association of Forensic Sciences

May 13 – May 17 2002 Canberra, ACT
The 16th International Symposium on the Forensic Sciences
• Awarded Best Poster in Section

Sept 16 – Sept 21 2001 Melbourne, VIC
The 7th Indo-Pacific Congress on Legal Medicine and Forensic Science

Abstract

The significance of the presence of petrol in motor vehicle fires has been challenged due to the possibility of a natural occurrence of petrol residues inside the vehicle. This study was undertaken to investigate the background levels of petrol on carpet in motor vehicles, and the potential transfer and persistence of petrol onto vehicle carpets through the 'normal' usage of motor vehicles.

The research was conducted via three studies: transfer and persistence studies were conducted to determine the transfer, evaporation and persistence of unleaded petrol on carpet; a known history study was conducted by the insertion of carpet mats into vehicles, for up to six months, with subsequent analysis for the presence of petrol; an unknown history study was conducted via the analysis of 300 carpet or carpet mat samples from vehicles, both before and after burning.

The results indicate that: small volumes of petrol are unlikely to be detected on carpet after 24 hours, and; only a small proportion of motor vehicles will exhibit the presence of petrol, in their original state, and then as evaporated petrol. None of the samples were found to contain petrol after burning.

These results demonstrate the significance of finding a large volume of fresh or slightly evaporated petrol on car carpet. As only trace levels are generally found without good reason, this may indicate the intentional addition of petrol to the vehicle interior.