B152   **Development of a Microspectrophotometric Spectrum Database for Comparison of Casework Textile Fiber Samples to Motor Vehicle Interior Fabrics**

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The goal of this presentation is to focus on a recent cold case investigation in Western Australia in which a textile fibers database was utilized for data interpretation and ultimately led to the discovery of potential links between fibers recovered from victims and motor vehicle interior fabric sources. This presentation will highlight the importance of the effective organization of large volumes of textile fiber data for forensic intelligence and evidentiary purposes and will include specific case examples.

This presentation will impact the forensic science community by illustrating the use of a casework fibers database containing motor vehicle interior fiber Microspectrophotometric (MSP) spectra as a powerful investigative tool. Victims of homicide are often transported in a motor vehicle prior to their death and/or prior to disposal of the body. Textile fibers recovered from motor vehicle interior fabrics may exhibit MSP spectra with characteristics unlike those of clothing fibers and may be used to link an offender, victim, or scene to a motor vehicle.

The database developed at ChemCentre is currently populated with more than 7,900 fiber samples, including approximately 900 samples from motor vehicle interior fabrics as well as casework and validation samples and other exemplar materials. The database allows the user to perform objective MSP spectral comparisons by calculating modified Pearson correlation coefficients and to visually compare images of fibers acquired via microscopy. The modified Pearson method of correlation was evaluated using repeat samples collected from more than 40 garments of various fiber types and by re-examining data from previously completed cases and proficiency trials.

An interpretation approach utilizing the database has been developed in response to an investigation which contained more than 4,400 fiber samples and no control garments. The requirement was to investigate potential links between multiple victims by searching for common sources of transferred fiber evidence. Therefore, fibers of any color or type were of potential evidentiary value. The database approach highlighted critically important fibers (those with close MSP spectral matches to large numbers of other fibers) and used these to form groups of fibers with corresponding properties. Groups were then confirmed via comparison microscopy (in brightfield and fluorescence modes). This approach eliminates the need to investigate each fiber individually and minimizes the number of comparisons required via comparison microscopy, allowing for efficient and effective handling of large fiber cases. The database has also been used for objective fiber comparison in routine casework in concurrence with standard fibers methodology.

It is envisioned that future development of the database methodology will include collation of casework fiber samples and the formation of large collections of exemplar materials (primarily motor vehicle interior fabrics) across jurisdictions.

Textile Fibers, Database, Microspectrophotometry