The Development of *The Incendiary Device Database (IDD):*A Forensic Fire Investigation Tool

Kate Grimwood¹, Sonia Scott¹, Melissa Salmon²

¹ Australian Institute of Forensic Fire Investigation Pty Ltd, Sydney, NSW, Australia. ² M.G. Salmon & Associates Pty Ltd, Sydney, NSW, Australia.

INTRODUCTION

Databases are used in almost every aspect of forensic science to record specific intelligence. The manipulation of gathered data is focused toward the development of intelligence based actions to prevent future incidents occurring. An Australian example of a state and territory fed database is the National Automated Fingerprint Identification System (NAFIS).

Presently, information such as the specific details of an incendiary device remain part of an individual fire investigator's report and is not easily accessible to be used for intelligence-led fire investigation (FI), whether by the internal organisation or other stakeholders.

It was proposed that the development of a repository for information pertaining to incendiary devices would be beneficial for forensic FI. This initiated the data gathering process required for the set up and population of the fields proposed for the database.

Subsequently the Australian Institute of Forensic Fire Investigation (AIFFI) is developing such a tool, the *Incendiary Device Database* (IDD), and this poster outlines the progress of the database to date.

DATA COLLECTION

A survey was developed by AIFFI to aid in the capture of information pertaining to the detection and investigation of incendiary devices. A copy of the current survey can be viewed by scanning the QR code in Figure 1 below, or by visiting www.aiffi.com.

The surveys have been, and continue to be, distributed to Australian and International FI agencies. Fire investigators were (and continue to be) invited to provide information pertaining to incendiary devices they have encountered.

Within NSW, private investigators and Fire and Rescue NSW (FRNSW) have started the process of collecting information for inclusion into the IDD. In the coming months, private investigators and emergency services in the remaining Australian states and territories will be invited to contribute data to the IDD. Information from international sources, such as private fire investigators and government agencies, will also be sought in the coming months.

The survey aims to collect data regarding the geographical location of the site, the components of the device, the location of the device at the site, the extent of damage to the device, the ease of manufacture of the device from commercially available materials and a comparison to other cases involving the same or similar devices. In addition, the survey seeks the supply of images and any additional information that the investigator may feel is pertinent.



Figure 1: QR Code Link to AIFFI IDD Survey 2014.

DATABASE INTERFACE

Security has been the major consideration during the developmental stages of this project. At this stage the database can only be accessed by AIFFI employees and is stored securely. An example of the IDD interface has been provided in Figure 2.

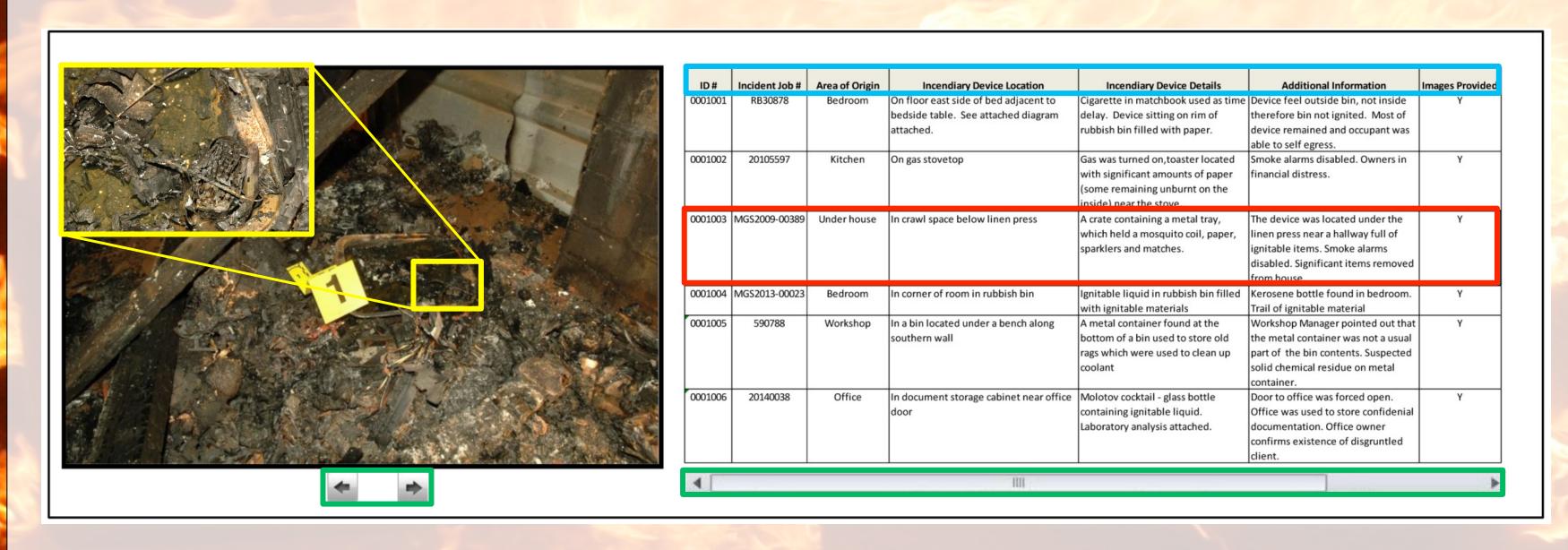


Figure 2: IDD Interface Example.

The information pertaining to the highlighted boxes in Figure 2 has been presented below.

- The data gathered from the surveys are entered into fields that directly correspond to the questions. The fields serve as the method of filtration to mine data specific to requests for information regarding incendiary devices.
- When viewing the data from a specific investigation images have been linked to the file and can be viewed at the same time as the data.
- The data fields and the images can be scrolled or toggled through, respectively. Figure 3 provides examples of additional images that are linked to ID# 0001003.
- Depending on the resolution of the images provided to the IDD each image can be enlarged.







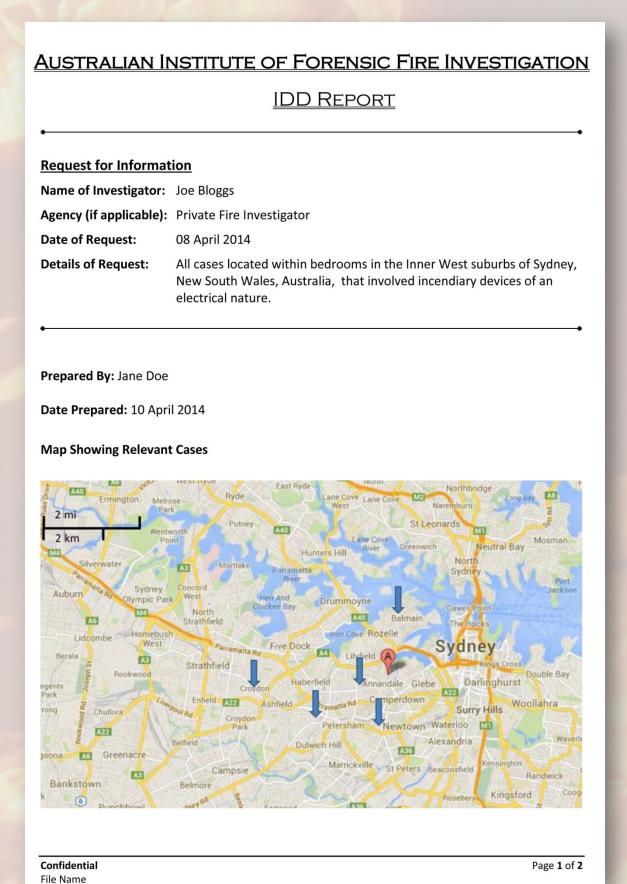
Figure 3: a) during the excavation a crate housing the incendiary device is uncovered, b) sparklers and the remains of matches in molten remains, c) an exemplar mosquito coil holder (from the site) next to the one found in situ.

An individual investigator, or investigative group, will always have access to the data they provide. However, requests for information involving the data housed in the IDD will be reserved for stakeholders with a genuine requirement to use this investigative tool.

DATA MINING OUTPUT

Each request for information will dictate how the IDD Report will be presented. The report has the capacity to be tailored to specific requirements based on the factors (that are available for filtration) requested by the stakeholder. The filtration factors are based on the questions asked in the survey and include, but are certainly not limited to, site/geographical location, type of device and area of origin. A report can also include, subject to availability, images for each case the filtration process identifies.

An example of an IDD Report with a specific location, area of origin and a broad category of incendiary device is shown below in Figure 4.



IDD Information	
Data Request	Investigator Comments
Date of Incident	
Date of Investigation	
Address of Incident	
Area of Origin	
Reason for Arson Determination	
Type of Incendiary Device	
Incendiary Device Details	
Reasoning Behind Conclusion Surrounding Incendiary Device (significantly damaged)	
Incendiary Device Location	
Components Easily Found at Scene?	
Details of Similar Incendiary Devices Found Previously	
Variations to the Incendiary Device Previously Encountered	
Details of Similar Burn Patterns Previously Encountered	
Relevant Research Conducted Additional Information	
Image Log	
Lancing Bills Manner	Description of Image
Image File Name	2 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
Image File Name	

Figure 4: An example of an IDD Report provided once a formal request for information.

Due to the sensitive nature of the information contained in the IDD, access is controlled by AIFFI. Requests for information are restricted to stakeholders with a genuine requirement for the information, such as fire investigators in private industry or those employed in emergency services or relevant government agencies. To reiterate, investigators who have contributed data to the IDD are given unrestricted access to the information they have provided. Stakeholders that request reports that extend to all information for a particular data point of interest will be required to prepare a formal request for information to AIFFI. The requests are assessed by AIFFI, case by case, based on the legitimate need of the requesting stakeholder.

CONCLUSION

The collation of information collected and produced by individual fire investigators into a database has the potential to improve future intelligence-led fire investigations, both in quality and efficiency. The IDD is a novel concept that has the potential to achieve such an improvement. The IDD is still in its infancy, however, interest in the IDD has been substantial and is expected to be at a reportable stage in the next six to twelve months.

ACKNOWLEDGEMENTS

M.G. Salmon & Associates Pty Ltd are gratefully acknowledged for the supply of the images included in this work. In addition, Ross Brogan and FRNSW are acknowledged for their interest in this project.

AUSTRALIAN INSTITUTE OF FORENSIC FIRE INVESTIGATION