IDENTIFICATION AND RECOVERY OF FINGERPRINTS FROM GLASS FRAGMENTS IN MOLOTOV COCKTAIL CASES

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UNIVERSITI TEKNOLOGI MALAYSIA
IDENTIFICATION AND RECOVERY OF FINGERPRINTS FROM GLASS FRAGMENTS IN MOLOTOV COCKTAIL CASES

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A dissertation submitted in partial fulfillment of the requirements for the award of the degree of Master of Science (Forensic Science)

Faculty of Science
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JANUARY 2013
Specially dedicated to my beloved family
Ku, Mak, Nadia, Burhan, Fatin and Syafiq. Thank you for your love and support.
ACKNOWLEDGEMENT

Firstly, I wish to acknowledge my main supervisor Associate Professor Dr. Mohd Shahrul Bahari for his support, encouragement and guidance from the very beginning until the end. I would also like to thank my co-supervisors, Superintendent Ng Song Huat from Fingerprint Section, PDRM Forensic Laboratory, Cheras and Assistant Fire Commissioner, Tn. Azlimin Mat Noor from Fire and Rescue Department of Malaysia, Cyberjaya. I am grateful and indebted to them for their sincere, valuable guidance extended to me and for providing me with all the necessary facilities. My appreciation is also extended to Mahadir Mohd Noh and firemen from Fire and Rescue Department of Pandan Indah, Kuala Lumpur, who help me in sampling process, Inspector Syed Faizul Shah from PDRM Forensic Laboratory, Cheras who supervised and guided me at the simulation scene, and En. Puwira Jaya Othman from PDRM headquarters, Bukit Aman, Kuala Lumpur for his knowledge and assistance in the analysis of fingerprints. Also, thank to Associate Professor Dr. Umi Kalthom Ahmad, for her guidance and advices, especially in areas relating to forensic field.

Sincere thank to my dear fellow postgraduates in Forensic Science for their help and encouragement especially to Suriati Abd Latif who helped me in the analysis of fingerprints, Siti Mariani Yusof and Anita Weinheimer who helped me in the sampling process. To my parents, Sayed Mohamad Sayed A Rani and Meriam Malek, thank you for the continuous encouragement and support.

I also would like to thank the Laboratory Assistant En. Mohd Nazri Zainal and Miss Siti Rafezah Mat Emin and UTM for allowing me to use the equipments and the laboratory. In the deepest sense of gratitude, I must thank my beloved family for giving me their blessing to do my thesis here even though they are far. Finally, not to be forgotten to anyone that contributes on this research project whether directly or indirectly. I am sincerely grateful to all of them for their willingness to help and may Allah bless you.
ABSTRACT

Increasing reports on Molotov cocktail cases in the local media has warrant a need for a detailed investigation of the perpetrator of the crime. A study is therefore embarked to compare fingerprint quality recovered from glass fragments of Molotov cocktails. The accelerants used were petrol, kerosene, diesel and motor oil. Different types of accelerant were used to observe the effect of accelerant on the quality of fingerprint recovered from glass fragment of Molotov cocktails. In the study, Molotov cocktails were exploded and glass fragments bearing fingerprint marks were collected and transported back to laboratory for analysis. Prior to fingerprint analysis, soot were removed from glass fragment using three techniques of brushing, NaOH (2\%) wash solution and tape lifting. After soot removal, enhancement fingerprint were done by using methods such as dusting method, superglue fuming method and Small Particle Reagent (SPR) method. Then, fingerprints from glass fragment of Molotov cocktails were identified by manual matching. Powder dusting method was used for sample petrol only because most of glass fragment were obtained in dry condition. Other than that, superglue fuming method was used in majority of sample whether Molotov cocktails were allowed to burn out naturally or the fire was extinguished using water. Small particle reagent method was mostly used for the wet glass fragment. Fingerprints recovered were photographed and sent for manual matching. Based on the enhancement fingerprint method used, most of the latent fingerprint was developed with various qualities. Based on the percent recovery, SPR method shows the best recovery (43.75\%) at the scale 3 fingerprint, followed by superglue fuming and dusting powder. In manual matching method, percentage success rate in the case where fire of Molotov cocktails was allowed to burn out naturally was 55.56\% while in the case of fire extinguished using water, percentage success rate was 33.33\%. This study also showed that manual matching method of fingerprints recovered from Molotov cocktails with fingerprint obtained from suspect or standard can be done.
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LIST OF ABBREVIATION

SPR  -  Small Particle Reagent
PDRM -  Polis Diraja Malaysia
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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Arson is a crime that may generally be defined as intentional destruction of property via fire for unlawful purposes (Gannon and Pina, 2010). Arson represents a serious problem both in cost of human lives and money (Tan et al., 2000). It leads to major financial damage, serious injury or death around the world (Labree et al., 2010).

Molotov cocktails or petrol bombs are incendiary devices often used in war, terrorism, riot and civil unrest situations due to the availability of materials and ease of manufacture. Fingerprints are always available from the shattered glass of Molotov cocktails. Recovery of fingerprints on the glass fragment of Molotov cocktails debris would be a greater evidential value, directly linking the suspect with the bottle that has been thrown (Stow and McGurry, 2006).

Fire investigators always ignore the glass fragment of Molotov cocktails to be collected as evidence. They always believe fingerprints on glass fragment will be destroyed by fire. Although many of the fingerprints will be destroyed by fire, some will survive even on the incendiary device (Stow and McGurry, 2006).
1.2 Statement of Problem

In riot or civil unrest situations cases, arsonists often use Molotov cocktail as their incendiary devices. The types of accelerant used as fuel differ based on the availability of accelerant. When an arsonist carries a Molotov cocktail to the scene, their fingerprint will be deposited on the item. Fire investigators always believe the fingerprints on glass fragments will be destroyed by fire and did not collected the evidence. This study is designed to study possibility of recovering fingerprints in Molotov cocktail cases and the effects of accelerant towards the recovery of the fingerprints. Quality of fingerprint was analysed based on the different fingerprint recovery techniques. With the available standards to be matched, these fingerprints could be used as a critical evidence in arson cases.

1.3 Objectives of Study

The objectives of this study are:

1) To recover the fingerprint marks on the glass fragment of Molotov cocktails by using the dusting method, superglue fuming method and Small Particle Reagent (SPR) method.
2) To identify the fingerprint that has been obtained from the fragment of Molotov cocktails.
3) To compare the quality of the recovered fingerprint based on the different recovery techniques.

1.4 Scope of Study

This study is carried out to determine the possibility of recovering fingerprint marks on the glass fragment which have been covered by soot. Petrol, kerosene, diesel and motor oil will be used in this study as an accelerant. Three methods will
be applied in the soot removal from glass fragment. The methods are brushing, NaOH wash solution and tape lifting. After the removal of soot, the enhancement of fingerprint marks will be done by using dusting powder, superglue fuming and Small Particle Reagent (SPR) methods. Then, fingerprints will be identified and the qualities from the different technique compared.

1.5 Significance of Study

This study would help and facilitate the investigator who will be handling Molotov cocktails cases either from the Fire and Rescue Department, the Royal Police or the Chemistry Department. This study may assist the analyst in choosing the most suitable method for fingerprint enhancement based on the type of accelerant used in Molotov cocktail. In addition, it may also help with study and comparison of the quality of fingerprint recovered from glass fragment of Molotov cocktail based on different enhancement fingerprint technique.
REFERENCES


