

UNIVERSITI TEKNOLOGI MARA

**EXPOSURE TO CHROMIUM IN USED CRANKCASE
OIL AMONG MECHANICS**

SITI NORAIZA BINTI MAHUSSIN

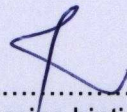
**BACHELOR IN ENVIRONMENTAL HEALTH AND
SAFETY (HONS.)**

JULY 2014

Declaration by Student

Project entitled "Exposure to Chromium in Used Crankcase Oil among Mechanics" is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Mr. Mohd Izwan b. Masngut as Project Supervisor and Mr. Ahmad Razali b. Ishak as Co-supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

Student's Signature:



.....
(Siti Noraiza binti Mahussin)

2010620924

860401-29-5314

Date:.....25/8/2014.....

ACKNOWLEDGEMENT

"In the name of Allah, the Most Gracious and the Most Merciful"

I would like to express my utmost gratitude to those who helped me throughout the completion of this Final Year Project (FYP) Report. It has been a long way through, but I have managed to make it up by the help and support of those who are very dear to my heart.

In this opportunity, I would like to dedicate a special thank to my supervisor, Mr. Mohd Izwan b. Masngut, and co-supervisor, Mr. Ahmad Razali b. Ishak for their continuous support, advices, criticisms and guidance that have been extremely valuable in the development of this research. In addition, I would like to heartily thanking all the Environmental Health and Safety lecturers as well as the Assistant of Science Officer, Mr. Muhamad Azwat b. Abdullah for constantly being a helping hand during my laboratory sessions.

To my dear husband, Muhamad Hilmi b. Shamsuddin and daughter, Nur Afifah bt. Muhamad Hilmi, my father, mother and my dear brothers and sisters; an expression of love and deepest appreciation on their infinity understanding upon the completion of the report is all that I could ever managed to give. May Allah S.W.T repay them for their deeds.

Not to forget, my sincere thanks to all my dearest course mates, friends and my fellow colleagues for their help, support and bring me such a comfort of being around after all these years. Thank you for being there for me.

Lastly, my appreciation is extended to those whose name is not mentioned here, yet giving me lots of help. This report may not complete without the support from all of you. Thank you.

TABLE OF CONTENTS

TITLE	PAGE
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF APPENDICES	viii
LIST OF ABBREVIATION	ix
ABSTRACT	x
ABSTRAK	xi
CHAPTER ONE: INTRODUCTION	
1.1 Background Information	1
1.2 Problem Statement	2
1.3 Study Justification	3
1.4 Research Objectives	4
1.4.1 General Objectives	4
1.4.2 Specific Objectives	4
1.5 Research Hypothesis	4
1.6 Conceptual Framework	5
1.7 Conceptual and Operational Definition	6
CHAPTER TWO: LITERATURE REVIEW	
2.1 Composition of Crankcase Oil	7
2.2 Chromium	7
2.3 The Route of Exposure of Heavy Metal to Human Body	10
2.4 Tolerable Daily Intake (TDI)	10
2.5 Occupational Exposure Criteria	11
2.6 Guidelines and Regulations	13
2.7 Extramammary Paget's Disease	14

ABSTRACT

Exposure to Chromium in Used Crankcase Oil among Mechanics

Siti Noraiza Binti Mahussin

Introduction: Considerable quantities of heavy metals, such as Lead (Pb), Zinc (Zn), Copper (Cu), Chromium (Cr), Nickel (Ni) and Cadmium (Cd), are contained in used crankcase oil and these metals are highly toxic to organisms. The norm of work as a mechanic was directly dealing with the used oil added with the lack of awareness on personal hygiene amongst mechanics will increase the possibility of heavy metal to be consumed either by ingestion, inhalation or absorption.

Methodology: A cross sectional study was conducted to determine the Chromium (Cr) concentration level in used crankcase oil. This study also intends to determine nails chromium level among the exposed group at the selected auto-workshop. The ex-situ analysis was carried out to determine Chromium in used crankcase oil and nail samples. The analysis was carried out using Flame Atomic Absorption Spectrometry (FAAS). This study aims to associate chromium level in nails to the occupational exposure of used crankcase oil to mechanics. The samples were taken from 3 auto-mechanic workshop around Gombak. Respondents that participated in this study were mechanics. A total of 15 mechanics (n=15) were participated in this study. The controlled group consists of 15 people (n=15) whose working in the workshops but do not handling crankcase oil such as clerk, people who frequently visited the workshops and people who live nearby study location.

Results: Result shows the presence of chromium in used crankcase oil taken from 3 auto workshops in Kampung Kerdas and the presence of chromium in nails of exposed and non-exposed group. Chromium concentration in nails of exposed group is higher than in non-exposed group. Mean value of chromium in 15 nail samples of exposed group is 35.61 mg/kg with standard deviation of 28.941. The data distribution is normal because of p-value is <0.05 for normality test whereas mean value of chromium in 15 nail samples of non-exposed group is 4.55 mg/kg with standard deviation of 1.972. There is significant difference of chromium concentration in nails between exposed and non-exposed group p-value is 0.000. Chromium concentration in nails between exposed and non-exposed group was significantly different ($p<0.05$) by comparing mean using t-test.

Conclusion: It is concluded that Chromium is present in used crankcase oil and highest detection in nails of exposed group. Lacking in awareness and knowledge among the mechanics increasing the risk exposure to their health. Over years, this negligence may take their tolls as in the case of Extramammary Paget Disease has proven for continuous exposure to used crankcase oil.

Keywords: *Crankcase oil, Chromium (Cr), Extramammary Paget Disease, mechanics, biomonitoring*