

UNIVERSITI TEKNOLOGI MARA

**EXPOSURE TO HEAVY METAL IN USED CRANKCASE
OIL AMONG MECHANICS AND HEALTH RISK
ASSESSMENT**

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**Project paper submitted in partial fulfillment of the requirements for
the degree of Bachelor in Environmental Health and Safety (Hons.)**

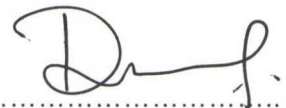
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Declaration by Student

Project entitled "Exposure to Heavy Metal in Used Crankcase Oil among Mechanics and Health Risk Assessment" 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. This project was done under the guidance of Mr. Mohd Izwan Bin Masngut as Project Supervisor and Mr. Ahmad Razali Bin 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).

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"In the name of God, the most Gracious, the most Compassionate"

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ABSTRACT

Exposure to Heavy Metal in Used Crankcase Oil among Mechanic and Health Risk Assessment

Izzat Bin Mohd

Introduction: Used motor oil is a very dangerous polluting product. It contains Polynuclear Aromatic Hydrocarbons (PAH) and high levels of heavy metals. PAH, such as benzo[a]pyrene, are well known for their high carcinogenicity. Considerable quantities of heavy metals, such as Lead (Pb), Zinc (Zn), Cuprum (Cu), Chromium (Cr), Nickel (Ni) and Cadmium (Cd), are contained in used crankcase oil and these metals are highly toxic to organisms. Environmental exposure to chemical mixtures may adversely affect human health.

Methodology: A cross sectional study was conducted at 2 types of workshop; motorcycle workshop and car workshop located at Klang, Selangor. Sampling data collection involves collecting 60 samples of used crankcase oil at 8 different workshop (4 motorcycle and 4 car workshop). Questionnaires distribution was carried out to 50 respondents randomly chosen from the workers at the workshop or known as mechanics.

Results: Result shown that the used crankcase oil of motorcycle contain average concentration 0.0228mg/g for Lead, Zinc 0.2137mg/g, Copper 0.0119 mg/g, and Chromium 0.0830mg/g respectively. While, for the car is Lead 0.0238mg/g, Zinc 0.1380mg/g, Copper 0.0246 mg/g, and Chromium 0.0893mg/g. The Independent t- test and Mann Whitney proved that, there are differences between concentration of Chromium (Cr) and Copper (Cu) at significant value $p < 0.05$ for both types of oil. Calculation Average Daily Intake (ADI) for Lead (Pb), Zinc (Zn), Copper (Cu), and Chromium (Cr) among workers at motorcycle and car workshop are not exceeding the Tolerable Daily Intake Standard (TDI) which are 3.6×10^{-3} for Pb, 5×10^{-1} for Zn, 8.3×10^{-2} for Cu, and 5×10^{-3} for Cr respectively. Hazard Index show that none of the result exceed 1, indicate no potential chronic effects.

Conclusion: As a conclusion, clear evidence of heavy metal (Pb, Zn, Cu, Cr) presence in car and motorcycle used crankcase oil. However, only Cr and Cu shown a significant different on sample between both types of vehicles. The ADI of Pb, Zn, Cu, and Cr towards mechanics are not exceeding the tolerable daily intake standard. Hazard Risk shows the result where there is no potential chronic effect occurs.

Keywords: Crankcase oil, Pb, Cu, Zn, Cr