UNIVERSITI TEKNOLOGI MARA

DERMAL EXPOSURE ASSESSMENT OF METALWORKING FLUID AEROSOL ON WORKERS' HEALTH

HAIRUL NAZMIN B NASRUDDIN

Project paper\ submitted in partial fulfilment of the requirements
for the Degree of
Bachelor of Environmental Health and Safety

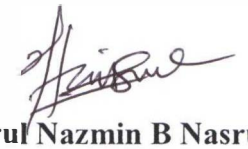
Faculty of Health Sciences

May 2010

Declaration

This project paper entitled Dermal Exposure Assessment of Metalworking Fluid Aerosol on Workers' Health is a presentation of my original research work. Wherever contribution 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 work was done under the guidance of Mr. Abd Rahim B Dal (Project Supervisor) and Dr. Mohd Rafee B Baharuddin (Project Co-Supervisor), at the Universiti Teknologi Mara (UiTM).



[Hairul Nazmin B Nasruddin]

In my capacity as supervisor of the candidate's project, I certify that the above statements are true to the best of my knowledge.

[Mr. Abd Rahim B Dal]

Date:

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious, The Most Merciful.

Alhamdulillah. Thanks to Allah SWT, whom with His willing giving me the opportunity to complete this Final Year Project at PRIMA Metal Industries Sdn Bhd. This project is to fulfill the requirement to complete the degree in Environmental Health and Safety Program at UiTM. This report is based on the methods given by the university.

Firstly, with my open heart, full of appreciations and thankful especially to Mr. Abd Rahim b. Dal as my Supervisor for this project for all consultations and guidance along the project duration. Deepest thank to Dr. Mohd Rafee b. Baharuddin, the Co-Supervisor for this project for helping me to finish my final year project. Also thanks to all Environmental Health and Safety lecturers (UiTM) for their effort in order to ensure this project successful.

It is not forgotten to Safety and Health Department staffs especially to my site Supervisor, Mr. Ahmad Norsyam b. Ahmad Zainy for giving me an opportunity to do the project in the field. I also want to thanks the Machine Shop Department's staffs and all workers in PRIMA Metal Industries Sdn Bhd who involved in this matter.

Deepest thanks and appreciation to my parents, family, special mate of mine, and others who directly or indirectly involved in this project, for their cooperation, encouragement, constructive suggestion and full of support for the report completion, from the beginning till the end. Thank you so much for all comments, useful critics, and recommendation along the project period.

TABLE OF CONTENTS

Abstract

Metalworking fluid (MWF) is the oils and liquids that are used to cool and lubricate the metal work pieces, removing metal debris, reduce heat and friction between the cutting tool, and help prevent burning and smoking during machining, milling, or any other metal-work processes. The MWF that used in PRIMA Metal Industries Sdn Bhd is Mobilcut 102. The Semi-Quantitative Dermal Exposure Assessment Method (DREAM) has been used in order to calculate the total actual dermal exposure of metalworking fluid to workers. 2 types of established questionnaires were distributed among 40 workers in Machine Shop Department. The questionnaires are DREAM Questionnaire and Dermal Health Effects Questionnaire. The Dermal Health Effects Questionnaire was developed based on modified Nordic Occupational Skin Questionnaire. 9 body parts were assessed as required by the DREAM Method. Statistical analyses were calculated by using SPSS. Hand shows the most exposed body part to metalworking fluid which is 4500 DU (Extremely High Exposure) level. The mean and standard deviation for wear and not wear the hand clothing material (PPE) are 964.0706 (±1180.286) DU and 1112.575 (±794.944) DU respectively. Other more, Bucket Grinder shows greater total dermal exposure than Machine Operator with mean 1806.556 (±1087.352) DU and 751.511 (±615.103) Du respectively. There are significant inversed correlation identified between total dermal exposure and redness (p-value=0.007), flaking (p-value=0.003), and itching (p-value=0.018) which may caused by workers clothing factors. Dermal exposure to MWF may cause several dermal health effects.

Key words: Metalworking fluid, DREAM Method, DREAM Unit (DU)