

UNIVERSITI TEKNOLOGI MARA

**A STUDY OF CARBON BLACK DUST AND LUNG
FUNCTION PERFORMANCE AMONG WORKERS
AT PRINTING INDUSTRY**

ARMAWATY NATASHA BINTI ABDUL RAHMAN

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Supervisor's Signature

Project entitled A Study Carbon Black dust and Lung Function Performance among workers at Printing Industry was prepared by Armawaty Natasha Binti Abdul Rahman and has been submitted to the Faculty of Health Sciences in fulfillment of the requirement for the degree of Bachelor in Environmental Health and Safety (Hons.).

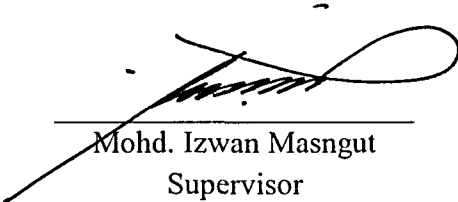
Approved by:



Assoc.Prof. Rodziah Ismail
Head of Department
Environmental Health
Faculty of Health Sciences
Universiti Teknologi MARA

Date: 26/5/2010

Accepted to be evaluated by:

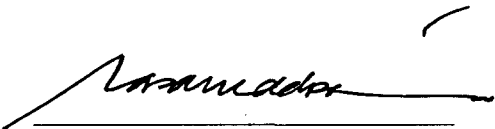


Mohd. Izwan Masngut
Supervisor

Environmental Health Department
Faculty of Health Sciences
Universiti Teknologi MARA

Date: 26-5-2010

Accepted to be evaluated by:



Nasaruddin Abd. Rahman
Co-Supervisor

Environmental Health Department
Faculty of Health Sciences
Universiti Teknologi MARA

Date: 26 Mei 2010

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ABSTRACT

A STUDY OF CARBON BLACK DUST AND LUNG FUNCTION PERFORMANCE AMONG WORKERS AT PRINTING INDUSTRY

Armawaty Natasha Binti Abdul Rahman

A comparative cross-sectional study was aimed to assessing lung function performance and respiratory symptoms among printing process workers as consequence of carbon black exposure in printing industry. A questionnaire was used to gain the information on health history and respiratory symptoms of exposed and unexposed group respondent. The carbon black dust concentration was measured using *GILLIAN®* Sampling Pump (Model *GilAir-5/program- tri-mode air sampler*) at flow rate 2.0 L/min with 5 µm pore size of PVC filter and 37mm support screen with cassette filter holder. Lung function performance level was carried out on 60 respondents; exposed (n=30), unexposed (n=30) respectively using *Vitolograph®* Spirometer Model 2120 to measure forced expiratory volume in 1 second (FEV₁), forced vital capacity (FVC) and ratio of total volume of air exhaled (FEV₁/FVC). Results for the concentration of carbon black dust were at 0.672 mg/m³. Result on lung function performance shown that mean FEV₁% predicted of exposed (mean=70.96) and unexposed (mean=83.04). FVC% predicted was 74.3, 13.09 (exposed) and 79.93, 7.10 (unexposed). Identified respiratory symptoms vary among exposed respondent from coughing (63.3%), sore throat (60.0%), nose irritation (53.3%), and mucous dryness (43.3%). In conclusion, lung function performance was lower in FEV₁, FVC and FEV₁/FVC among exposed group than unexposed group. Results indicated that carbon black dust exposure significantly has an impact on respiratory performances in exposed group. Hierarchy of control is recommended in reducing the dust level in printing room, together with medical health surveillance monitoring on exposed and unexposed group.

Keywords: *Carbon Black dust, lung function performance, respiratory symptoms.*

CHAPTER 1

INTRODUCTION

1.1 Background information

Carbon Black is refer to material consisting of more that 85% element carbon in the form of near-spherical colloid particles and coalesced particle aggregates of colloidal size obtained by partial combustion or thermal decomposition of hydrocarbon. (NIOSH, 1978). Carbon blacks are very fine powdered forms of elemental carbon and are manufactured by several different processes which all involve the controlled vapour phase pyrolysis of liquid or gaseous hydrocarbons. (Gardiner *et. al*, 2001)

For most of this century until the late 1980s, large scale newspaper production in Britain and other countries was mainly carried out with rotary letterpress printing machines. This process used inks based on mineral oils pigmented with carbon black. (Riddell, 1994) The high speed rotation of the presses tended to result in the production of ink particles and paper dust that were projected into the pressroom atmosphere as a fine mist, a proportion of which was of respirable size. (Leon *et al*,1994).

Kompleks Sri Utusan is one of the main subsidiaries companies of Utusan Group and located at Bandar Baru Bangi, Selangor. Engaged in four major business concerns namely publishing, printing, advertising and online services. Kompleks Sri Utusan Printing Department operates by 120 workers in processing includes pre-press, on-press and pre-press process. The printing used the petroleum-based inks which consists of hazardous chemical include carbon black. The high number of emission of carbon black dust produces, since the production of newspaper and other printing product was high.