

**THE EFFECTIVENESS OF EXHAUST FAN IN REMOVING CO AND CO₂
IN SOME SELECTED CLASSROOM IN FACULTY OF APPLIED
SCIENCE, UiTM SHAH ALAM**

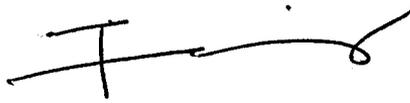
NORAZREEN BINTI BAKRY

**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Physics
In the Faculty of Applied Sciences
University Teknologi MARA**

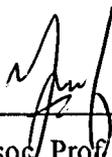
JULY 2013

This Final Year Project Report entitled “**The Effectiveness of Exhaust Fan in Removing CO and CO₂ in some selected classroom in faculty of Applied Science, UiTM Shah Alam**” was submitted by Norareen binti Bakry, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by

Dr. Salmah binti Ahmed
Supervisor
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Mr. Fairus Muhammad Darus
Co. Supervisor
B. Sc. (Hons.) Environmental Technology
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Assoc. Prof. Md. Yusof Theeran
Project Coordinator
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor



Assoc. Prof. Ab Malik Marwan Ali
Head of Programme
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: _____

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	v
LIST OF ABBREVIATIONS	vii
ABSTRACT	viii
ABSTRAK	ix
CHAPTER 1 INTRODUCTION	
1.1 Background	2
1.2 Problem statement	3
1.3 Significance of study	3
1.4 Scope of study	3
1.5 Objectives of study	4
CHAPTER 2 LITERATURE REVIEW	
2.1 Indoor air quality	5
2.2 Ventilation rate	6
2.3 Carbon dioxide concentrations	7
CHAPTER 3 METHODOLOGY	9
3.1 Site description	10
3.2 Sampling	
CHAPTER 4	
4.1 The Behavior of parameters due to occupancy	15
4.2 The trends of parameters with and without exhaust fan	27
4.3 Relationship between temperature and carbon dioxide contents for occupied and occupied cases.	32
CHAPTER 5	
5.1 Conclusion	34
5.2 Recommendations	35
CITED REFERENCES	36
CURRICULUM VITAE	38

ABSTRACT

THE EFFECTIVENESS OF EXHAUST FAN IN REMOVING CO AND CO₂ IN SOME SELECTED CLASSROOMS IN FACULTY OF APPLIED SCIENCE, UiTM SHAH ALAM

Having good quality of indoor environment in classroom is very important because students spend more than five hours per day inside classrooms. In this project work, the concentrations and the values of some Indoor Air Quality parameters were investigated inside some selected classrooms in the Faculty of Applied Science, UiTM Shah Alam. The parameters are the contents of carbon monoxide (CO), carbon dioxide (CO₂), air temperature and relative air humidity. These parameters were measured using Direct Sense IAQ Monitor. The equipment was placed 1.0 m above the floor and was set up for 8 hours from 8.30 am to 5.30 pm. The data collected then was downloaded and analyzed using Microsoft excel. The measurement was carried out for one month. It was found that the contents of CO in all classrooms were very much lower than the allowed maximum value according to the international IAQ standard for health and safety reasons. However the values of CO₂ were found higher than the maximum value set in the standard which is 1000 ppm especially when the rooms are fully occupied. The air conditioning system helps to maintain the temperature within the comfort range, thus providing good thermal comfort. Unfortunately the circulation of air seems to be not sufficient in removing CO₂ from the interior space. From this study it was observed that using exhaust fan throughout the day along with the air conditioning system could be a good approach to reduce the air contamination due to high concentration of CO₂ in classroom. By temporarily switching off the exhaust fan when the rooms are not occupied would save electricity energy. Unfortunately, by doing so, CO₂ is trapped inside the room when the exhaust fan is turned off.

CHAPTER 1

INTRODUCTION

1.1 Background

Indoor Air Quality, (IAQ) is defined as the quality of the air in an office or the building environments especially as it relates to the health and comfort of building occupants. It has been identified as one of the most critical global environmental problems (WRI, 1998). It is represented by the concentration of pollution and thermal (temperature and relative humidity) conditions that affect the health and comfort of occupants (Brookhaven National Laboratory, 2009). The previous study revealed that poor Indoor Air Quality will lead to sick building syndrome. Sick Building Syndrome which simply describes situations in which buildings occupants experience acute health and comfort effects that seem linked to time spent in a building, but no specific illness or cause can be identified, according to the US Environmental Protection Agency.

Outdoor Air Quality is also commonly referred to the ambient air. Until the late 1960s, attention to air quality was primarily focused on the outdoors because, by the time, many adverse health effects (Zhang, 2005). People spend most of their time indoors and institutional buildings, such as classrooms, represent a significant fraction of the day (Yip et al., 2004) and since people spend more than 90% of their time indoors, good indoor air quality is very important to us. The