UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF INDUSTRIAL AIR POLLUTION MONITORING SYSTEM FOR SAFETY AND HEALTH ENHANCEMENT AND SUSTAINABLE WORK ENVIRONMENT IN SMALL AND MEDIUM INDUSTRIES (SMI’s)

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Thesis submitted in fulfillment of a requirement For the degree of Doctor of Philosophy

Faculty of Mechanical Engineering

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CANDIDATE'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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ABSTRACT

The study is focused on the development of Industrial Air Pollution Monitoring System (IAPMOS) for small and medium industries application. The objectives of the study are to develop a system with special configuration on wireless data communications with the ability to analyze hazard and risk especially in welding process. The Quality Function Deployment (QFD) was used as a tool in the design of the system. Questionnaires were distributed to the relevant personnel in the related manufacturing industries. Case studies were carried out in two manufacturing companies located in Shah Alam, Selangor. Another case study on wireless data communication was conducted in the Walk-in Stability Chamber (WiSC) at Universiti Tun Hussein Onn Malaysia (UTHM). The system analyzed the data after save file and it is used as the Hazard Risk Index (HRI) approach. The results on risk level were used for Risk Classification Matrix (RCM) approach. The system features have warning signs (by colour) and buzzer to ensure the safety and health personnel paid attention to the outcome toxic gas data collected. The system can reach 150m length for accurate wireless data transfer. The IAPMOS can be used by the industries to create safe, healthy and sustainable work environment and reduce occupational diseases.
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TABLE OF CONTENTS

TITLE PAGE i
CANDIDATE'S DECLARATION ii
ABSTRACT iii
ACKNOWLEDGEMENTS iv
TABLE OF CONTENTS v
LIST OF TABLES x
LIST OF FIGURES xii
LIST OF ABBREVIATIONS xv

CHAPTER 1 : INTRODUCTION

1.1 Introduction 1
1.2 Background of the Problem 1
   1.2.1 Safety and Health Awareness in Workplace 4
   1.2.2 Industrial Accidents Occurrence 6
   1.2.3 Unconducive Work Environment 6
1.3 The Problem Statement 9
1.4 Research Question 10
1.5 Research Objectives and Goals 10
1.6 Significance of the Study 11
   1.6.1 Industry (Employer and employee) 11
   1.6.2 Government 12
   1.6.3 Education Sector 12
1.7 Limitations 13
1.8 Organization of the Thesis 14
1.9 Summary 17