DESIGN AND DEVELOPMENT OF HIGH SENSITIVITY GAS DETECTION SYSTEM FOR MONITORING SAFETY DURING WELDING ACTIVITY IN HABITAT

This thesis is represented in partial of fulfillment for the award of the

Bachelor (Hons.) in Electronic Engineering

University Technology MARA

(March 2013)

MOHD. ERWAN BIN MOHD USSDEK (2010822644)

Faculty of Electrical Engineering

University Technology MARA

40450 Shah Alam, Selangor

Malaysia

ACKNOWLEDGEMENT

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them. I am highly indebted to **Encik Syed Mutalib Al Junid** for his guidance and constant supervision as well as for providing necessary information regarding the project and also for his support in completing the project. I would like to express my gratitude towards my freinds for their kind co-operation and encouragement which help me in completion of this project. I would like to express my special gratitude and thanks to industry persons for giving me such attention and time. My thanks and appreciations also go to people who have willingly helped me out with their abilities.

ABSTRACT

In oil and gas environment, safety is the main issue highlighted especially in welding activities. Therefore, this study is an attempt to investigate and design a new mechanism in monitoring the safety via detecting gas concentration level. The objective of this project is to design and develop a new safety precaution system during welding activity in habitat using low cost microcontroller. Furthermore, the study been carried out by divided in three stages; sensing, controlling and notification. Different gas concentration level has been tested and verified for determine the safety range in sensing stage. While, the controlling part control the response based on the detection of the gas in the environment. Indicator and Secure Digital (SD) memory have been used to notify and record the activity in notification stage. At the end of this paper, the system has been successfully designed, developed, tested and verified at prototype level. Besides, the system starts to trigger when sensing level produce 1.416V which represent 30% of gas concentration. Nevertheless, the gas sensor required 10 seconds initialized time to stabilize and produce the desired sensing level.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

There are a lot of accident due explosion of flammable gasses at oil rig recorded from time to time especially for the works related to welding activity as reported in [1]. Therefore, a handheld gas monitoring has widely used in current practice but it cannot guarantee the safety during the welding activity. On the other hand, the type of handheld gas monitoring system used is a general gas monitoring system and not a specific device develop for the monitoring gas concentration during welding activity. Furthermore, it is not equipped with notification or alarm to alert the existence of the high concentration flammable gas in surrounding and it based on individual.

The individual gas monitoring factor contributes for scattered location of gas monitoring during welding activity in workspace and increased the potential of accident occurs. While, the fan that supplied air inside the habitat to keep the pressure is unsynchronized and not controlled by any mechanism. Due to this circumstance, the air flow to the habitat via air vent is not guaranteed and explosion will occur if the high concentration flammable gas is entering [7]. Therefore, the demand for a systematic, synchronize and precise location solution is needed.