AUTOMATED MEASUREMENT AND INTERACTIVE CONTROL OF A PROCESS PLANT USING LABVIEW

INSTITUT PENGURUSAN PENYELIDIKAN

UNIVERSITI TEKNOLOGI MARA

40450 SHAH ALAM, SELANGOR

MALAYSIA

BY :

NORHAZIMI HAMZAH

RIZAL MAT JUSOH

AFAF ROZAN MOHD RADZOL

OCTOBER 2009

ACKNOWLEDGMENT

All praise to Allah SWT, The Most Beneficent and The Most Merciful. Thank you to Allah SWT for granting us patience and confidence in completing this project.

We would like to acknowledge and express our sincere gratitude towards those that directly or indirectly contributed to the progress of this research. To all lecturers, technicians and friends, thanks for all the help and ideas given during the course of this research. And to UiTM Pulau Pinang, thank you for all the cooperation and support in terms of financial and facilities.

Finally, we would also like to thank our family for their continuous concerns, encouragement and support.

TABLE OF CONTENTS

DECLARATIONS

ACKNOWLEDGEMENTS i

TABLE OF CONTENTS ii-iv

LIST OF FIGURES v-vi

LIST OF TABLES vii

ABBREVIATIONS viii

ABSTRACT ix

CHAPTER 1 INTRODUCTION

1.0 Chapter Overview 1

1.1 Background 1

1.2 Problem Statement 2

1.3 Objective of the Project 3

1.4 Scope of Works 3

1.5 Organization of this Thesis 4

CHAPTER 2 LITERATURE REVIEW

2.0 Chapter Overview 5

2.1	Introduction	5
2.2	Hardware	5
	2.2.1 The Armfield PCT40	5
	2.2.2 Transducer	7
	2.2.2.1 Piezoelectric Design	8
2.3	Software	9
	2.3.1 LabVIEW Overview	10
2.4	Data Acquisition (DAQ) System	11
CHAPTER 3	**RESEARCH PROCEDURE**	13
3.0	Chapter Overview	13
3.1	Hardware Development	13
	3.1.1 Sensor Testing	13
	3.1.2 Signal Conditioning	15
	3.1.3 Data Acquisition (DAQ) System Development	16
3.2	Software Development	19
	3.2.1 Front Panel Development	19
CHAPTER 4	**RESULTS AND DISCUSSION**	24
4.1	Chapter Overview	24
4.2	Result	24
4.3	Discussion	28
CHAPTER 5	**CONCLUSION AND FUTURE DEVELOPMENT**	30
5.0	Chapter Overview	31

5.1 Conclusion 31

5.2 Future Development 31

REFERENCES 32

APPENDIX

ABSTRACT

Monitoring and controlling of the plant parameters involve necessary data acquisition. Data acquisition process at the simplest level can be accomplished manually using paper and pencil to record readings from a multimeter or any other instrument. However, data recording process that require large number and very frequent data readings must include instruments or microcontrollers to acquire and record data precisely. In this report, the development of a low cost and easily modifies PC based virtual instrumentation that is capable of monitoring and operational control of the plants parameters is outline. The data acquisition interface is based on existing equipments of the Armfield Multifunction Process Control Teaching System. The equipment is interfaced to the PC using the NI USB-6009 DAQ card and LabVIEW is used as the development environment. The water level control is chosen for the experimental setup. The developed system has the advantage of simplicity, flexibility, feasibility and easy operation.