

FINAL YEAR PROJECT REPORT  
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FACULTY OF MECHANICAL ENGINEERING  
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SHAH ALAM

**DEVELOPMENT OF  
A DIGITAL-PROPELLER- ANEMOMETER**

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APRIL 1999

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## **ACKNOWLEDGEMENT**

In the name of Allah, the Most Beneficent and Merciful.

First of all, we wish to express our deep sense of gratitude and deep appreciation to Prof. Ir.Dr.Ow Chee Sheng who initiated and supervised this project. His endless help and guidance throughout this project have made it possible to obtain the desired result.

Furthermore, we are also indeed grateful to Mr Maliki, electronic lecturer from Faculty of Electrical Engineering, for his advice on electronic design of the project and willingness to assist us. We would like to convey our appreciation to Mr. Radzuan (CNC machine technician), Mr. Adam (Mechanical engineering workshop technician), Mr. Shawal (Metrology laboratory technician), who have given us their best support and some useful knowledge in implementing the project; without which, this project cannot be completed successfully. We would also wish to thank the staff and friends who have helped us directly or indirectly in completing this project.

Finally we would like to express our very sincere thanks to our beloved father and mother, and family members for their encouragement in our studies in ITM. Above all our greatest thank to Allah S.W.T in giving us good health and the trait of patience; both of which were instrumental in accomplishing this final year project.

Thank you.

Abd. Rahim Bin Mahamad Sahab

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## **PREFACE**

The science of instrumentation is of fundamental importance to engineers, scientist, and medical workers. Instruments are the eyes and ears of the technologists. Without sensors and their associated signal processing systems there would be no modern instrument. The progress that has been made in almost all areas of technology can be seen in terms of the rate at which the necessary instrumentation has been developed. For example in recent years many improvements have been made to the performance of the internal combustion engine. One of the reasons is that in the last few years sensor have been developed which allow investigations to be made of the ways in which the flame front spreads inside the cylinder after ignition.

The process of instrumentation is often considered solely in terms of the sensors used and their associated electronics. However, there are two step involved in making any measurement. These are, first, getting the data, which is where sensors and electronics are used and second, analyzing it.

The development of a Digital-Propeller Anemometer involves a few sets of instrumentation process. These processes include the process of getting the data (design and develop the mechanical and electronic system in order to capture the data), to transmit and to interface the data with a computer, and finally to process the data (software development). Therefore this report contains a few chapters to illustrate the flow of the processes. In general each chapter contains, a discussion of basic terms and concepts associated with the subject of that chapter. For example Chapter 1 will discuss about the objective of the project and generally the overview of project. In this chapter the discussion will be more on how the arrangement in developing a Digital-Propeller-Anemometer. Subsequently we shall discuss the instrumentation of mechanical system. This topic will be covered in Chapter 2. The design concept, design constraint in mechanical system, material selection and relevant information about mechanical

system will be discussed in this chapter. This chapter will also discuss the initial stage how the signal being developed in mechanical system.

Chapter 3 covers the areas of electronic circuit design and digital electronics system. This chapter also discuss how the signal is being transferred from the mechanical system (from Chapter 2) to the computer. The equipment and apparatus is explained in detail. Examples of equipment used are sensor, electronic circuit board, I/O card, and the others computer interfacing hardware accessories.

Chapter 4 provides information on computer software development, where Quick Basic is used as a language in developing the program. Generally, this chapter is the continuation of Chapter 3. The declaration of Base address and port address for data interfacing will be presented in this chapter. This chapter will explain how the data being transferred through an address decoder, data bus and being processed in the CPU. Next, this data will be manipulated using the developed software to get the rotational speed of shaft in RPM.

Chapter 5 discusses about the calibration of the instrumentation. The calibration is done using hot wire anemometer in the wind tunnel. Moreover this chapter also discuss about the test to determine the Distance Constant of the instrumentation. The Distance Constant is one of parameters, which can be employed to determine the sensitivity of a Digital-Propeller-Anemometer instrument.

Chapter 6 describes on the overall scenario of the project and future recommendation. Thereupon, this project report concludes with Chapter 7. All relevant information such as the drawing of mechanical component, the description of a few terms of electronics, the operation manual of equipment used, etc are enclosed in the Appendix.