

# **MEASUREMENT AND ANALYSIS OF PAWATECH OPTICAL FIBER LINK PERFORMANCE IN CENTRAL REGION**

This project report is presented in partial fulfillment for the award of the Bachelor of  
Electrical Engineering (Hons.)  
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## **ACKNOWLEDGEMENT**

I would like to thank my supervisor, Assc. Prof. Hajjah Rusnani Bte Ariffin for her kindness, support and concern to assist me making this project successful.

I would also like to express my thanks to Mr. Amir Bin Din, owner of the Pawatech Sdn. Bhd for allowing me to make the measurement, monitoring and analysis throughout theoptical fiber cable links controlled around the central region of Malaysia.

I am also indebted to the various help and discussions offered by Dr. Zaiki Bin Awang, Pawatech's stuffs and also Communication Laboratory Assistants.

I would like to give my sincere thanks to my family who have sacrificed so much of all that was theirs to give me a good education and for their never ending prayers. I would like to thank them for being supportive and understanding.

Finally, to all the readers, thank you for spending your time to read my thesis and hopefully you can gain some knowledge from it.

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## **ABSTRACT**

Optical fiber cable is the transmission medium for the optical fiber system. It is widely used nowadays due to the tremendous performance. However, the process of installing the cable needs to be done properly to avoid the performance drop. In this thesis, the process of installing underground optical fiber cables will be explained. Analysis is done for optical fiber links in the central region of Malaysia. The installation process of a fiber link includes planning and design, preparing the manholes and ducts, laying the sub-ducts and optical fiber cables and conducting several related tests. Finally, after undergoing all of these processes, the link will be commissioned.

After installation and acceptance test are done, a maintenance job should be carried out properly. Several optical fiber link performance measurements that was carried out by Pawatech is analyzed. Methods to recover the problematic links are also suggested. Besides a good condition of optical fiber link, links with the faulty cable due to the bending, cable break and crack are also will be discussed. Also, an analysis of a case where measurement techniques are neglected is highlighted. In this case, the measurement results is found to be unacceptable, not because of the faulty cable, but due to the wrong technique used. A long distance link with the cable joint by using the patching and splicing methods is also discussed.

From the results obtained, it can be concluded that optical fiber cable links need to be monitored constantly since various problem may occur. If a cable link was found to be faulty, rectification solutions include straightening the cable, splicing the faulty point and changing the cable itself. After rectification a final acceptance test should be done to confirm the requirement.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Introduction to Optical Fiber System**

Due to the advantages of the optical fiber system over twisted pair and coaxial cable systems, the fiber optic communication has been hailed as the superior method for transmitting video, audio, data and various signals. Therefore, fiber optic transmission systems have been increasingly integrated into a wide range of applications across many industries. (The fiber optic systems consist of three parts, transmitter, transmission medium and the receiver. Hence, the main topic of this thesis is the transmission medium of the optical fiber system where the optical fiber cables are used, as the transmission line.)

### **1.2 Scope of the Project**

The study, measurement and analysis of several optical fiber links which prepared and maintained in center region of Malaysia will be explained and discussed clearly in this thesis. The measurements were taken under the supervision and guidance of Pawatech Sdn. Bhd.'s technicians. The process of installing underground fiber optic cable will be explained starting from the process of designing and planning until the project was commissioned. Since the maintenance job was also involved in this project, the maintenance procedures will be presented. Some measurements and analysis of different cases regarding to the link's performance in selected links around the Malaysia Central Region will also be discussed.