E-LEARNING ON MINIATURE CIRCUIT BREAKER (MCB)
AND
MOULDED CASE CIRCUIT BREAKER (MCCB)

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e – Learning on Miniature Circuit Breaker (MCB) and Molded Case Circuit Breaker (MCCB)

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A report submitted in partial fulfillment of the requirements for the degree of Electrical Engineering (Industrial Power)

Faculty of Electrical Engineering
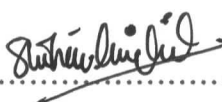UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2009

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Date   : ....11/5/2009.......................

I declare that this report entitle "e – Learning on Miniature Circuit Breaker (MCB) and Molded Case Circuit Breaker (MCCB)" is the result of my own research accept as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature   :..

Name   : SHUHADAH BINTI ZAKARIAH

Date   : 11/05/09 ....

To beloved my family

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ABSTRACT

The purpose of this project is to design and build e-Learning (Electronic- Learning) on Miniature Circuit Breaker (MCB) and Molded Case Circuit Breaker (MCCB) system. E-Learning means the delivery of learning with the assistance of interactive, electronic technology, whether offline or online. The other objective of this project is to provide an add-on features so that any enhancement could be added in order to extend the application system interactive with computer for learning and education. This project is software based, which contains a learning courses on principle operation of MCB and MCCB, types, application, rules and regulations, current rating, overload protection and also short circuit basic calculation. This system comes with interesting and user-friendly software that was developed by using Macromedia Flash 8 software. This system is capable to let user to train and understand e-Learning course with easy. It also has a guide line or help to conduct user on how to utilize the software correctly.

ABSTRAK

Tujuan projek ini adalah untuk merekabentuk dan membina satu sistem e-Pembelajaran (Pengajian Elektronik) untuk Pemutus Litar Miniatur (MCB) dan Pemutus Litar Kotak Teracu (MCCB). E Learning bererti penyampaian pengajian yang disampaikan dengan bantuan interaktif, teknologi elektronik, sama ada luar talian atau dalam talian. Objektif lain projek ini adalah untuk menyediakan satu ciri tambahan dalam sistem aplikasi interaktif menggunakan komputer untuk tujuan pembelajaran dan juga pendidikan. Projek ini adalah berdasarkan kepada perisian untuk membinanya, yang mana ia mengandungi satu kursus pembelajaran iaitu prisip operasi MCB dan MCCB, jenis, peraturan Institut Kejuruteraan Elektrik dan Elektronik (IEE), aplikasi, had limit arus, perlindungan arus lampau dan juga asas pengiraan arus bocor. Sistem ini didatangkan dengan perisian menarik dan ramah pengguna yang dibangunkan dengan menggunakan perisian Macromedia Flash 8. Sistem ini adalah berupaya untuk membiarkan pengguna melatih dan memahami kursus e- Pembelajaran dengan mudah. Ia juga mempunyai satu garis panduan yang dapat membantu mengawal pengguna menggunakan perisian ini dengan betul .

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CHAPTER 1

INTRODUCTION

1.1   Background

E-Learning (or Electronic Learning) is a type of education where the medium of instruction is computer technology. And also is defined as a network or online that takes place in a formal context and uses a range of multimedia technologies. The learning is carried out either individually or on small or large group basis and can be used in conjunction with face - to - face, or exclusively in open and distance learning (ODL). As such, e-learning is not confined to the boundaries of the online format but also includes the offline format using any form of electronic media to facilitate the teaching and learning process. You have the ability to work on your course at any time and from anywhere provide you have a computer, internet access and a board email account. E- Learning furnishes user with the self-paced modules, knowledge of the internet and computer skills, an opportunity to become independent and self reliant, flexibility of time-tabling and scheduling.

Why is e-Learning important for higher education? It is important because there is interactive technology offers a new mode of engagement with ideas via both material and social interactivity online. E-Learning offers the ability to manage quality at scale, and share resources across networks, its greater flexibility of provision in time and place makes it good for widening participation. And also reduction in social difference afforded by online networking fits with the idea that students should take greater responsibility for their own learning.

In this project, the information about MCB and MCCB has been applied to the study module. The project is to expose people with device protection that use in our home and also in the industrial area. The project also comes with interactive learning which offer the user with the tutorial. So, they don't have to go other place to find the material, all user need is computer with internet connection

than surf this e-learning on MCB and MCCB. To develop this project, software "Macromedia Flash 8.0" has been used, as this software offer integrated animation and other interactive things.

1.2 Problem statements

E-learning has become one of most popular methods for the people to acquire their expected knowledge. Due to the high demand and the effectiveness of this method commonly in educations, e-Learning has become a useful tool for students to acquire and develop certain skills.

This project is been developed based on the problem arise where it lead the new idea to make this learn ware. The main reason that will be highlight is about user difficulties to find the information MCB and MCCB. As, example, when user surf the internet type MCB or MCCB to search the information about it, the result would not be as user want. The web just display MCB or MCCB product by electrical company, which the purpose is to introduce their product and sell it. Other than that, the website that contains information of MCB or MCCB is not complete for example some website just explains the basic information of MCB or MCCB without their characteristic.

References for this MCB and MCCB also difficult to be found as some books only write a little bit about the information needed and some of the information is not complete. User whom does not have basic electrical knowledge will feel hard to understand the information that written in the book. The information in books are limited as operation MCB or MCCB, the information just introduce to the explanation about it and not explain the types that have in operation on MCB or MCCB.

In e-Learning on miniature circuit breaker and molded case circuit breaker, these problem are discussed and solved using interactive presentation and easy to understand. To develop interactive and user friendly e-Learning, the understanding of Macromedia Flash 8 software is need. This is to ensure that the outcome of the project is reaching its goal and suits the target audiences.

1.3 Project objective

This projects has it own objective to achieve and overcome the problems that arise before these projects have been developed. The main objectives of this project are:

- To design a courseware of MCB and MCCB in interactive way to convince the student uses this system.
- To analyze the functional of MCB and MCCB for industrial and home.
- To analyze the effectiveness of the courseware by survey questions to final year student in BEKP course.

1.4 Project scope

Miniature Circuit Breaker (MCB) and Moulded Circuit Breaker (MCCB) title is a big scope and need to be specified so that the project goes on track and run smoothly. For this project, a few scopes have been specified as guidance in developing this project.

The scopes that have been specified are:

- Introduction to MCB and MCCB
- Operation of MCB and MCCB
- Types of MCB
- Rating current
- Characteristic for MCB and MCCB
- Short circuit and overload current for MCB

1.5 Report Structure

In this project report, it consists of eight chapters namely Introduction, Literature Review, Miniature Circuit Breaker (MCB) and Moulded Case Circuit Breaker (MCCB) Theory, Project Methodology, Software Development, Project result and analysis of MCB and MCCB.

For the chapter one, it is about overview for the project that reader can understand overall of the project. Problem statement give a problem that occur and the solution come with the project that has been suggested. In project objective, the objective to this project has been explained. It also explained about the project scope that will guide throughout this project development.

On the chapter two it is about the research for project, paper work, book and other information that related with the topic that has been suggested. The literature review that have been done with the summary and analysis which can help in develop this project.

MCB and MCCB will be explain in chapter three, which there can explains the theory, operation, characteristic, types and also the current rating. The graphs explain each of the characteristic in this project.

Chapter four in this report will show the project methodology. It also shows how the project software has been develop from the collecting information till the report done. This method helps me to organize time and work so that the project run as planned.

Chapter five covered the result and analysis from this project software. The results that achieve the objective of this project have been showed. It also showed the analysis from this project. The last chapter will be discussing about the project and evaluation of it. Suggestion also been added so that, the project can be added with more information in the future. Conclusion on the last will explain the summary for this project.

CHAPTER 2

LITERATURE REVIEW

Literature review was an activity for researcher to research about project or paper work that has been done by someone else. The research must be done in their scope of project, which means the research must be related to the projects that have been suggested. In order to make the project successful, advantages and disadvantage must be taken as guideline.

In other word literature review has been done to make sure:

i. It can give the overview of the project that has been suggested from the project that already been done by someone else.
ii. The research will highlight the advantage or disadvantage of the project before.
iii. The process or methodology that has been use for the project before can be implementing to the project that have been suggested.
iv. The information that not in the project before can be adds to make the project better.

2.1   Introduction

What is e-learning? e-Learning allows users to learn anywhere and usually at any time, as long as users have a properly configured computers or cell phones. E-Learning can be CD-ROM-based, Network-based or Internet-based. It can include text, video, audio, animation and virtual environments. It can be a very rich learning experience that can even surpass the level of training anyone might experience in a crowded classroom. It is self-paced, hands-on learning.

The quality of the electronic-based training, as in every form of training, is in its content and its delivery. E-Learning can suffer from many of the same pitfalls as classroom training, such as

boring slides, monotonous speech, and little opportunity for interaction. The beauty of e-Learning, however, is that new software allows the creation of every effective learning environment.

2.2   Previous E-Learning project in UTeM

A few literature reviews have been made regarding this project on intention to improve e-learning on miniature circuit breaker (MCB) and molded case circuit breaker (MCCB). Here a few e-Learning topics have been chosen such as Three Phase System by Prof. Marizan Sulaiman, Mdm Azrita Alias, Mr. Zainuddin Mat Isa and another topic is AC Power Transformer by Gabreil Jatu, Mdm. Aida Fazliana Abdul Kadir as a guideline to help in developing this project.

Prof. Marizan Sulaiman, Mdm Azrita Alias, Mr. Zainuddin Mat Isa have produced an e-learning title Three Phase System. In this e-Learning, they discussed about three phase system used in distribution system. The contents in this e-learning include phasor diagram for positive and negative sequence, three phase system for distribution system and three phase unbalanced loads. This e-Learning focus more on animation and a little bit of notes and formula [1].

Another e-learning produced by Gabreil Jatu and Mdm. Aida Fazliana Abdul Kadir focused on AC Power Transformer. They have gathered and produced a lot of information and animations for this topic. In this e-Learning contains a quiz, tutorial and virtual lab which differ to the Three Phase System e-Learning mention earlier [2].

2.3   Journals related to E-Learning

Journals search on the internet indicates types of comments and topics regarding the usage of e-Learning as a new method of e-Learning. Basically, the journals discussed e-learning as an alternative to gain knowledge and information besides using books.

Giuseppe Ali, Eleonora Bilotta, Lorella Gabriele, Pietro Pantano IAC, Consiglio Nazionale delle Ricerche and INFN – Gruppo c. Cosenza have produced a journal title an e-Learning Platform for Academy and Industry Networks. They discussed about the difference between virtual classroom and traditional teaching classroom. This environment specially designed for allowing the users to

interact in synchronous mode (web pages, web forum, e-mail, document repository), or mixed mode, where both modes are available on internet (streaming video, streaming audio) [3].

In other journal title Building an e-Learning Platform by access Grid and Data Grid Technologies, Hsin Chuan Ho, Chao-Tung Yang and Chi-Chung Chang discussed that distance education is a very effective method of e-Learning. The advantage of distance education is that it can overcome the obstacle of geographical location making students on remote sides feel that they are at the incidence like being in the environment of attending classes in classroom. Moreover, it can save cost and time of the students for their communication to and for the classroom [4].

2.4   Integrated Process Design for E-Learning: A Case Study

This paper research has been done by Hartini Ahmad, Zulkifli Mohamed Udin and Rushami Zein Yusoff is to examine the nature of learner's demand in e-Learning process such as in registration project. In this paper, the author have decide to discuss the matter of e-Learning use in higher education (HE) institution from the consequence about implementing and improve the way learn with using it. In this paper also tell about history about e-Learning, the pioneer university that evaluate about using this method to use as a learn ware. Group from the author have describe the way to develop a good e-Learning for user. Before develop the e-learning, research have been done to know what will be in future e-Learning that they want to build. While they got the result from the research, problem occurs also arise and must be consider then overcome it. In this paper also shown figure that explain the problem, in this paper they suggested e-Learning in registration process. The figure show the problem when the course registration process by manual, online and then the "integrated of productive processes from registration process to learning process should be created to ensure learner's expectations are consistently met" [5].

2.5   Principles and Design of Low Voltages System

On this book that written by Teo Cheng Yu in chapter 2, the topic is circuit breakers explain about the miniature circuit breaker and also molded case circuit breaker. The author briefly describes how the circuit breakers are used to provide adequate overcurrent protection. He explains it with some example of calculation to determine the suitable MCB and MCCB that can use, the

operating time for MCB and MCCB, the sizing cable and also shows the characteristic for MCB and MCCB. In this chapter, he also explains where the MCB and MCCB are suitable to use. The MCB are used extensively for protections of final circuits in domestic and commercial installation and for MCCB are required for installations which have higher fault level or higher current ratings exceeding 125 A. He also mentions in this chapter about MCB and MCCB with short circuit applied and overload protection applied in this circuit breaker.

2.6 Conclusion

As a conclusion, this literature review phase will determine the research and fact finding that related for the project that will be develop. On this literature review chapter it will focus on what the research that will be done. This will help to design this project by following each phase. This project also will become more interactive and attractive compare to the examples above, by using a simple and easy word to be understand by the user, colorful and attractive page to make user do not feel bored, easy example and also will include the tutorial to make sure the user understand about this project.

CHAPTER 4

PROJECT METHODOLOGY

4.1   Introduction

In order to complete the Projek Sarjana Muda (PSM), a methodology has been organized to ensure the progress of the project running well and as a strategy to overcome problems. It will describet the nature of this project, work, and the strategy in completing the project. Project methodology will also describe the approach that has been selected to use in this project, project requirement including software and hardware that are needed to develop this e-learning. Flow chart has been build to guide the explanation of the methodology that been used.

For Miniature Circuit Breaker (MCB) and Molded Case Circuit Breaker (MCCB) project, it has divided into 5 phase. Each phase contain activity to achieve their own objective which require input and output. At the end of each phase must have check point can be recognize that the phase have been completed and can proceed to another phase.

Below the phases that have been followed in order to develop this project:

Phase 1: Gathering information about MCB and MCCB

Phase 2: Learning Macromedia Flash 8

Phase 3: Sketching the Storyboard

Phase 4: Developing Project

Phase 5: Organizing the Project

4.2   Gathering information about MCB and MCCB

This is the first method being planned for this project. A lot of information has been gathered about MCB and MCCB from books and internet. For this only information's within the