GRAPHICAL USER INTERFACE DEVELOPMENT OF RISK ASSESSMENT IDENTIFICATION FOR APPROPRIATE LIGHTNING PROTECTION SYSTEM

Thesis is presented in partial fulfilment for the award of the Bachelor of Electrical Engineering (Honours)
UNIVERSITI TEKNOLOGI MARA

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NOVEMBER 2006

This thesis is forwarded to Faculty of Electrical Engineering, UNIVERSITI TEKNOLOGI MARA, in partial fulfilment for the award of Bachelor Engineering (Hons) in Electrical engineering.

ACKNOWLEDGEMENT

Firstly, all praised is to Allah S.W.T, our prophet Muhammad S.A.W and his family, companies, followers and the entire believer till the end of time.

Secondly, I would like to express my sincere appreciation to my supervisor, Dr. Zuhaina Binti Hj. Zakaria for her constant support, guidance and ideas for the period of completing this Final Year Project.

My sincere thanks to all the lecturers of Faculty of Electrical Engineering and other individuals involved for their co-operation and supported towards the success of this project.

To all my friends, thanks a lot for their support, interest, insight and purity of soul.

Last but not least, I would like to thank to my lovely family, especially my parent for being very supportive and understanding not to mention their empathy, moral and financial support.

ABSTRACT

There are two types of lightning strikes that need to be protected which are direct strikes and indirect strikes (transient overvoltage). Field studies of both types of lightning strike show that the lightning protections system (LPS) can be provided by determining the value of risk assessment or risk factor. This thesis describes the progress of interactive graphical user interface (GUI) for calculating the value of risk assessment or risk factor. The GUI determines the value of risk assessment or risk factor and suggests the suitable lightning protection. The developed application will help end-users in determining the value of risk assessment or risk factor in an efficient manner. It is also shows the capability of MATLAB GUI programming in technical application.

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CHAPTER 1

INTRODUCTION

1.1   INTRODUCTION

Lightning is a natural hazard that is more widespread in the tropical regions than elsewhere. Consequently, the damages and fatalities due to direct lightning strikes are much higher in the tropics. Hence there is a vital need for protection against direct lightning strikes. This protection comes in form of lightning protection system. The secondary effects caused by lightning should also be considered since it become threat to electronic systems. The existing lightning protection standards that are sometimes referred to in Malaysia are the IEC-61024 (International), BS 6651 (United Kingdom), NFPA780 (USA), AS/ NZS 1768 (Australia and New Zealand), and CP33 (Singapore) [4]. However, this thesis will be based on BS 6651 as main reference.

1.2   PROBLEM STATEMENT

Lightning is a natural phenomenon with potentially devastating effects. Because of the high electrical potential of lightning (often exceeding 100 million volts and 40,000 amperes) and very rapid rise time of a lightning strike, no lightning protection can guarantee absolute safety from lightning [1]. Direct lightning strikes and transient overvoltage that induced by lightning onto power supplies, signal and communication lines represents a direct threat to people, buildings and sensitive electronic equipment. Statistics has shown that Malaysia has an average of 204 lightning days which is equivalent to 40 strikes per square kilometer per year according to the information provided by Malaysian Meteorological Service based on year 2003 until year 2005