THE INTERACTIVE PROGRAM FOR SELECTION OF THE

POWER CABLE BY USING MATLAB SOFTWARE.

This project is presented in partial fulfillment for the award of the

Bachelor Eng. (Hons) Electrical

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ACKNOWLEDGEMENT

In the name of Allah, the gracious and merciful, syukur Alhamdulillah, thank to Allah that give me strength and the opportunity to complete this thesis on the given time.

Firstly, my deepest appreciation goes to my parents and family, for their love, encouragement, understanding and for being my inspiration.

I would like to express my deep sense of gratitude appreciation and million thanks to our supervisor, Prof. Madya Ir. Zulkefli Yaacob for his consistent advice, sharing in valuable time, encouragement and patient during the development in completing this thesis. I will never forget everything, especially his cooperation for me and I appreciate it a lot.

I also like to express my special thanks to Mr. Mustafar Kamal Hamzah, my MATLAB/SIMULINK lecturer, who has shown tremendous support and encouragement towards the completion of this project.

Million thanks also go to my course mates and friends for giving the support and sharing all the valuable time in completing the project.

Lastly, special thanks also to the people who help directly or indirectly in the development process for this project.

ABSTRACT

The conventional method in calculating cable ampacity is to calculate it under prescribed conditions and then to apply derating factors to cater for real conditions. Most of the power cable manufacturers use this method for designing power cables, which results in manufacturing cost. If we consider the real conditions (installation methods and operating conditions etc) in the calculation procedure, more accurate values can be obtained and it will help in the economic design of power cables. As this method involves complicated mathematical formulae, it is necessary to have a computer program to handle the calculation part. The program will handles this situation which was developed using MATLAB version 7.0. The program can calculate the ampacity of low voltage and medium voltage power cable lay in free air or directly buried in the ground. The user has to input the required data of the power cable design as well as the cable installation method to the program. The program can calculate the continuous current rating at rated load as well as the cyclic current rating according to specified load profile of the power cable. The calculation procedure is in accordance with International Electrotechnical Commission Standard of IEC 60502 and IEC 60287. It is provides solution to cables operating at a rated voltages of 36kV and below. It is a valuable tool for electrical engineers, consultants, academic staff and electrical engineering students.

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CHAPTER 1

INTRODUCTION

1.0   Introduction to Selection of Power Cable.

Power cables are solid or stranded conductors surrounded by insulation, shielding and protective jacket. Generally, the power cables are rated low voltage less than 11kV and medium voltage (6-36 kV). Power cables are used with the heavy machines, feeders and branch circuits in industrial, commercial and electric utility applications.

For most of the power cable applications the ampacities can be determined by referring to cable manufacturers catalogues. These ampacity tables too can be obtained from the cable manufacturers. Normal procedure in calculating the current rating of a power cable is to calculate the current rating under prescribed conditions and then to apply appropriate derating factors to cater for actual installation methods and operating conditions.

The conventional method of cabling installation design mainly based on 16th Edition of IEE regulations. In this regulation, the fundamental concern of power cable engineering is to transmit current (power) economically and efficiently. For the selection of power cable and determination of conductor and screen cross-sectional area based on the ampacity the following data are necessary:-

    i.   Conductor losses

    ii.   Material considerations

    iii.   Voltage rating

    iv.   Load capacity in normal operation and operating conditions

    v.   Voltage drop

    vi.   Type of cable constructions

By using the proposed approach, more accurate ampacity values can be obtained. As the optimum conductor sizes can be obtained, the power cables can be designed more

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