FAULT ANALYSIS USING POWER SYSTEM SIMULATOR FOR ENGINEERING (PSS/E)

Thesis is presented in partial fulfillment for the award of the
Bachelor of Electrical Engineering (Hons.)
UNIVERSITI TEKNOLOGI MARA (UiTM)

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MAY 2010

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious and The Most Merciful. Praised be to Prophet Muhammad S.A.W, his companions and those who are on the path as what he preached upon. My everlasting thanks to Allah for granting me patience and hope to complete my final year project and thesis.

My utmost appreciation and gratefulness to Project Supervisor, Dr. Muhammad Murtadha b. Othman for untiring efforts in providing guidance, encouragement invaluable advises has helped tremendously in completing this project.

Thousand thanks to Mr. Rijalul Fahmi (Senior Researcher) for giving the co-operation, guidance and information to complete this project.

My sincere appreciation goes to my family especially my mother and my father for their motivation and support. Without them, I don't think I will be where I am today.

Last but not least, thanks to my entire friends especially Mr. Ahmad Firdaus bin Ahmad Morly and anybody who involved directly or indirectly for their support, help and advice.

Thank you.

ABSTRACT

This thesis present two types of fault analysis performed by using the Power System Simulator for Engineering (PSS/E) software. The objective is to determine the highest fault current for every type of fault condition. The types of unsymmetrical fault are line-to-ground fault, line-to-line fault and double-line-to-ground fault. The three-phase fault can be classified under symmetrical fault. Fault analysis was performed by using the Solve and Report Network with Unbalances (SCMU) and Automatic Sequence Fault Calculation (ASCC) tools provided by Power System Simulator for Engineering (PSS/E) software. The SCMU was performed to obtain the results of three-phase fault, line-to-ground fault and double-line-to-ground fault currents. Line-to-line fault current was obtained by using the ASCC procedure. A case study of 23 bus system is used for the analysis of fault in order to obtain the value of current based on the various types of fault.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

In power system, fault is defined as a defect in electrical systems due to which current is directed away from its intended path [1]. In normal operating conditions all the circuit elements of an electrical system carry currents whose magnitude depends on the value of the generator voltage and the effective impedances of all the power transmission and distribution system elements including the impedances of the loads [1][2]. An electric power system consists of generators, transformers, transmission lines and consumer equipment.

In power engineering, fault analysis can be divided into two which are symmetrical and unsymmetrical fault. The types of unsymmetrical fault are line-to-ground fault, line-to-line fault, and double-line-to-ground. The three-phase fault can be classified under symmetrical fault. Fault analysis is important in order to provide information for the selection of switchgear, setting of relays and stability of system operation [1][2]. Faults usually occur in a power system due to insulation failure, flashover, lightning, high wind, physical damage or human error [3][4]. Faults may also be caused by either short-circuits to earth or between live conductors, or may be caused by broken conductors in one or more phases. Sometimes, simultaneous faults may occur involving both short-circuit and broken conductor faults. Electrical systems commonly use fuses, relays and circuit breakers to protect their electrical equipment. In the event that a failure occurs, it would be desirable that this short circuit would affect only the portion of the electrical system