SIMULATION OF FAULT ANALYSIS AND DETERMINATION OF CIRCUIT BREAKER RATING

This thesis is presented in partial fulfillment for the award of the
Bachelor of Engineering (Honors) Electrical
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
MALAYSIA

MOHAMMAD IDHAM BIN MAHDI@MAHADI
2008298402
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR DARUL EHSAN

ACKNOWLEDGEMENT

Alhamdulillah, I would like to express my sincerely gratitude and special thanks to my project supervisor, Assoc Prof. Muhammad Yahya for being supportive and above all his guidance, comments and suggestions during the progression of this project. A special thanks to Rijalul Fahmi Bin Mustafa for his willingness in providing knowledge on how to use PSS-Adept software and other few technician whom have helped me during my research on this project.

Finally, my deepest appreciation goes to my family for their moral and spiritual support. I would like to thank them for treasured memories and loving support throughout my education. Last but not least, I also want to thanks to all my friends for their help and information support and to all people who involved whether directly or indirectly contribute towards the progress of this thesis.

ABSTRACT

This paper studies the analysis of fault and how to determine circuit breaker rating using PSS-Adept. Short circuits are the most frequent type of faults that occur in high voltage networks. When a fault occurs, a short-circuit current flows through the line and equipments, it may cause considerable damage to equipments and interruption of service to the consumers. Damage from short circuits can be prevented by employing fuses, circuit breakers, or other overload protection, which discontinue the electrical flow.

This paper analyzes faults on IEEE-recommended 6-Bus and 9-Bus system using power system simulation programmed for planning, design and analysis of distributed system (PSS/Adepts). However in this simulation software, the overcurrent (OC) relays will represent the protective device, the circuit breakers rating will be determined after. The coordination of OC relays will also be determined.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION OF FAULT ANALYSIS

Fault in a circuit is any failure which interferes with the normal flow of current. Most faults on transmission lines of 115 kV and higher are caused by lightning, which results in the flashover of insulators. The high voltage between a conductor and the grounded supporting tower causes ionization, which provides a path to ground for the charge induced by the lightning stroke. Once the ionized path to ground is established, the resultant low impedance to ground allows the flow of current from the conductor to ground and through the ground to the grounded neutral of a transformer or generator, thus completing the circuit.

In other words, fault conditions are caused in the system accidentally through insulation failure of equipment or flashover of lines initiated by a lightning stroke or through accidental faulty operation. In high voltage networks, short circuits are the most frequent type of faults [1]. When short circuit condition occurs, a heavy current (called short-circuit current) flows through the equipment, causing considerable damage to the equipment and interruption of service to the consumers. Most commonly the location of the fault is calculated by means of some impedance measurement of the faulted loop either directly with the absolute phasors, or with the delta change between pre-and post-