EFFECT OF CIRCUIT BREAKER RECLOSURE TIME ON THE PERFORMANCE OF A POWER SYSTEM

Project Report is presented in partial of fulfillment for the award of the Bachelor of Electrical Engineering (Hons)

UNIVERSITI TEKNOLOGI MARA

MALAYSIA

TUAN AFFINDI BIN TUAN ABDULLAH

FACULTY OF ELECTRICAL ENGINEERING

UNIVERSITI TEKNOLOGI MARA

40450 SHAH ALAM, SELANGOR

MALAYSIA

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ABSTRACT

The magnitude and duration of restrikes upon the reclosure of the terminals of a circuit-breaker is important as failure to close at the right time may lead to detrimental effect to the power system in which the circuit breaker reside. For the purpose of demonstrating the operation of the circuit breaker to high voltage engineering students, this project is undertaken. A model of the power system in which the circuit breaker resides is designed based on the IEC standard. At the source side of the circuit breaker a circuit is present for reproducing a (2-parameter IEC) transient recovery voltage, while the RLC circuit at the line side represents a short transmission line that is short circuited. A single-shot pulse generator represents the source of surge. The simulation was conducted using MATLAB/Simulink (MLS). Overvoltages caused by operation of high-voltage circuit-breaker contacts can only be predicted when the physical processes between the breaker contacts and the influence of different extinguishing media on the current interruption. As switching devices, it makes use of the ideal switch. The ideal switch in closed position is an ideal conductor (zero resistance) and in open position is an ideal isolator (infinite resistance). The ideal switch changes from close to open position instantaneously, and the sinusoidal current is always interrupted at current zero. The performance of the power system is analyzed in terms of the magnitude and duration of the restriking voltages. The result will get from this simulation will shown the best switching time to setup on the circuit breaker is between the range of 1.3 to 1.4 cycles. Here, the best switching time were found is about 1.32 cycle. At this condition, the best time for voltage restriking back have been found. It can be said that, this timer is closure compared to the IEC standard. By comparing the switching time made at various points on the sinusoidal power source, the importance of correct switching time can be appreciated.

Keywords: transmission line, circuit-breakers, pulse generator, MATLAB/Simulink (MLS)

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CHAPTER 1

INTRODUCTION

1.0 Introduction

The power system is one the most complex systems designed. Today, the power system always being upgrade to balance and to make sure the level of usage can be achieved. This condition will be needed a power system become more efficiently. The one model will be designed to find the best method by using the simulation. This simulation will be considered of all characteristic on the power system. The idea is that, to represent the exactly system have been set at real power system. The characteristic on this model will designed exactly same with the characteristic on the real life at the transmission line. It is important to this model to prevent the power system from overvoltage caused by lightning, utility switching operations, and other appliance switching.

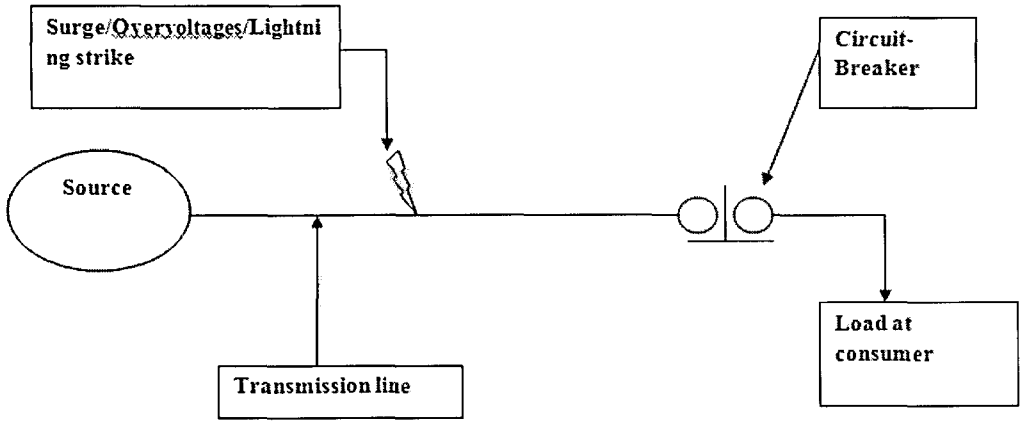

Figure 1: Typical setup of a power system

Figure 1 shows a typical setup of an alternating current power system having struck by a surge, which maybe lightning or switching overvoltage. This model consist of five parts like source of fault (surge, overvoltage and lightning strike), source from the power generation transmit to the load by using a long transmission line. The circuit breaker will