APPLICATION OF SUPERCONDUCTING FAULT CURRENT LIMITER IN POWER SYSTEM

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"IT IS BETTER IF YOU ARE APPROXIMATELY RIGHT THAN YOU ARE BEING PRECISELY WRONG".

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ABSTRACT

In this paper, an application of superconducting fault current limiter (SFCL) is proposed to limit the fault current that occurs in power system. The unsymmetrical faults are analyzed. The SFCL is incorporated to the bus which gives the highest fault current at two different positions that is the main position and the feeder position. There are two types of SFCL, purely resistive and purely inductive. Simulations were performed using MATLAB Programming and Simulink version 7.5 and were tested on 11 bus IEEE systems to show its capability and feasibility.

Keyword:
Fault current, unsymmetrical and superconducting fault current limiter.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

Any electrical circuit is at risk of a short-circuit condition and some sort of protection is regularly employed. The simple fuse box in older homes and the modern circuit breaker are examples of this protection device. When fault occurs in the system, it would have negative impact to the system. Faults occur due to lightning strikes, falling trees or other causes. Fault current is one of the current disturbances that are very large and hazardous. Often it will affect the power system [1].

The utilization of SFCL in power system provide the most effective way to limit the fault current and results in considerable saving from not having to utilize high capacity circuit breakers [2]. The circuit breaker at substations has a main function to protect the substation. However, they occasionally fail to handle the intense level of fault current and fail to trip the system. As a result, replacement of substation equipment and the maintenance incurred more cost.

When power delivery networks are upgraded or added to the system, fault levels can increase beyond the capabilities of the existing equipment [3]. By incorporating the SFCL to the circuit, the fault current will be reduced to an acceptable level so that the existing protection device can still be used to protect the system. This paper presents the application of resistive and inductive SFCL in 11-bus IEEE systems to demonstrate its