FAULT CURRENT LIMITING USING STATIC SERIES COMPENSATOR (SSC)

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ABSTRACT

In this paper, a control scheme of the Static Series Compensator (SSC) for fault current limiting has been proposed. The apparatus injects a voltage of variable magnitude in series with a transmission line. This injected voltage is in quadrature with the line current. Under normal condition, it is controlled in order to compensate for reactance of transmission line. When a disturbance occurs, injected voltage from phase shifter is applied to damping control of generator swing. This apparatus is expected to be a promising fault current limiter by using the leakage reactance of series transformer. The proposed methods were applied to 11 busbar system to show its feasibility and capability. All simulation was done using the MATLAB version 7.6 programming.

Keywords:

Static Series Compensator (SSC), fault current limiting, leakage reactance, Flexible AC Transmission System (FACTS).

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CHAPTER 1

INTRODUCTION

1.0 BACKGROUND

The fault current limitation based on impedance control is a quite known subject. Three phase faults can be controlled with limiting reactors and phase-to-ground faults need zero sequence impedance management, sometimes with the use of grounding devices. However, little information exists on short-circuit limitation with series voltage injection, in view of their recent introduction on networks. Since the series voltages are introduced through series coupling transformers, their respective leakage reactance contribute for fault current limitation.

The SSC is a solid-state voltage source and connected in series to power transmission lines in a power system. In this paper, a new control concept for the SSC to contribute to new application referred as fault current limiting has been purposed. Under normal condition, the SSC is controlled to compensate for reactance of transmission line in order to enhance the steady state stability of power system. During a short circuit, maintaining the output voltage from the SSC to be constant equal to the output voltage before the short circuit occur will make the output voltage from the SSC to be insignificant compared with the voltage across leakage reactance of the SSC. Thus, the apparatus is expected to be a promising fault current limiter by setting a certain amount of leakage reactance and the reactance compensation through the SSC.