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Proposed New Structure for Fault Current Limiting and Power Quality Improving Functions

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Abstract. Power quality problems are becoming more and more important for utilities due to growing number of sensitive loads. Among all the problems, voltage sage and momentary outage are the most serious ones. Furthermore, voltage sag is mainly caused by short circuits in distribution network. Therefore, utilities are currently exploring mitigation techniques that eliminate large fault current, increase the reliability of the power supply and improve the reliability and the system power quality.

In this paper, the bridge type fault current limiter based on nonsuperconducting coil have been integrated with a current regulator in order to absorb the energy of inductance and transfer it to the faulted load through PWM converter by fault occurring.

I. SIMULATION RESULTS

Simulations were carried out by the PSCAD/EMTDC. The modeled system and proposed FCL is shown in Fig.1.

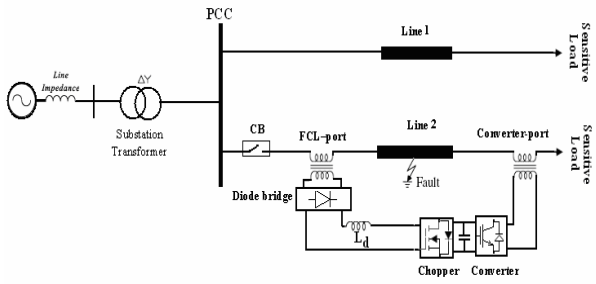

Fig.1. Simulated system

By using proposed FCL, as shown in plot1 of Fig.2, faulted load voltage is compensated completely in pre-fault and the faulted line current effectively limited by FCL port, as shown in plot2. Plot3 of Fig.2 shows the current of faulted loads. Plot 1 and plot 2 of Fig.3 shows the current of other loads connected to PCC and PCC voltage. It can be observed that the PCC voltage and the loads on other feeders would not affected by fault occurring.

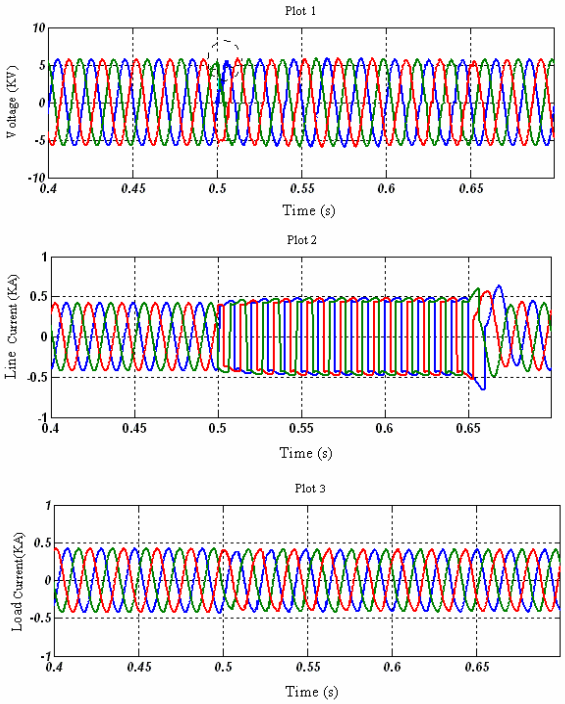

Fig. 2. Load voltage of faulted feeder, fault line current and load current of faulted feeder (Proposed FCL has been used)

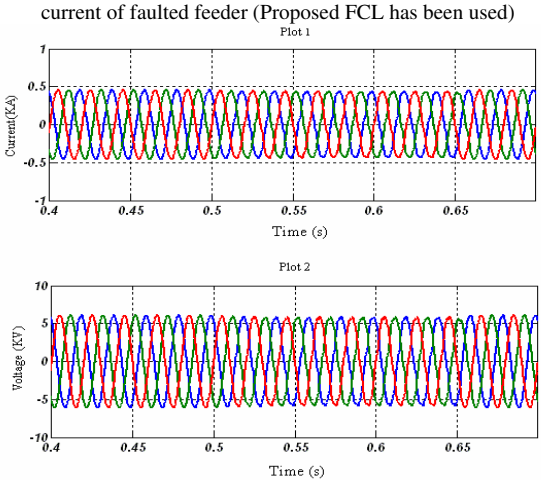

Fig.3. Current of other load connected to PCC and PCC voltage (Proposed FCL has been used)