

**Analysis of the Voltage and Current Unbalances in a Closed-loop
Distribution Feeder Caused by Removal of a Failed Capacitor Unit**

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Abstract

The main purpose of this paper is to analyze the voltage and current unbalances in a closed-loop distribution feeder caused by removal of a failed capacitor unit in an ungrounded Y-connected capacitor bank with one series group per phase. The distribution feeder unbalance as a result of the removal of one failed capacitor unit by its fuse is usually unexpected and unmanageable due to the poor environment. Distribution engineers should pay more attention to this situation to lessen its impact on the system and equipment. A sample feeder with closed-loop arrangement was used to simulate a practical feeder under normal and abnormal operation conditions, which a failed capacitor unit is removed. The simulation results indicate that the removal of a failed capacitor bank may significantly impact the system operation if the capacitor bank has only one series group. The outcomes are of value to distribution engineers to thoroughly realize the effects of the removal of a failed capacitor bank.

Key words: Distribution feeder; Closed-loop arrangement; Capacitor bank;
Unbalance factors; Voltage unbalance; Current unbalance