# Reducing Rate of Recovery Voltage Rise by Using Surge Capacitor in Shunt to Current Limiting Reactor

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*Abstract*—This work develops a novel technique to obtain optimal capacity of surge capacitor which is in shunt to Current Limiting Reactor (CLR). By considering incremental of the short circuit level of distribution and transmission lines, CLR has been employed in series to Circuit Breakers (CBs) to reduce Rate of Rise of Recovery Voltage (RRRV). Duration the installation of the reactors in series to capacitor banks, if a fault occurs, it will lead to failure of capacitor banks. Usage of surge capacitor in shunt to CLR is one of the approaches used for preventing the phenomenon. The proposed technique to calculate exact capacity of surge capacitor is proportional with value of CLR and depends on rate of break current of the CB. The capacitor increases peak time by changing oscillation frequency of voltage in two ends of CB and then results in reduction of RRRV. Simulation has been performed in EMTP software. To confirm superiority and accuracy of the proposed technique, in addition to RRRV, three other parameters have been studied and compared; i.e. Transient Recovery Voltage (TRV) and peak time as well as peak transient voltage.