

Recovery Voltages and Sustained Currents for a Single Phase Line to Ground Fault

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Abstract: *In an extra high voltage system with the neutral grounded, the most common type of outage is due to a single-phase line to ground fault. For a long section of transmission line, the restoring of the electric strength of the arc path after switching off the faulty phase, is greatly influenced by the capacitive and electromagnetic coupling with the healthy phases. The line current in the faulted section - the so-called sustained current and the recovery voltage i.e. the voltage between the faulted section and ground - are the quantities that result from these couplings. The amplitude and duration of this current and voltage are the major factors that determine the success of a single-phase automatic reclosing operation. The line current in the faulted section sustain the electric arc for some time, even after the faulty phase has been disconnected and the existence of a coupling voltage hinders the restoration of the electric strength of the arc path, both obstacles to the next reclosing. This paper considers the effect of the electrostatic and electromagnetic couplings in a transmission system on the automatic reclosing operation when a single phase to line ground fault occurs. These considerations are based on analytical expressions derived in this investigation and the more important preliminary results are discussed.*

Keywords: *Recovery voltages, ground fault, reclosing operation, couplings, transmission system*