CAPACITOR COMPENSATION OF OVERHEAD LINE VOLTAGE DROP

When a current is drawn from the overhead line to a train distant from the feeder station, there is a voltage drop in the overhead due to its resistance and inductance. In emergency conditions when one feeder station is inoperative, the adjacent feeder station has to supply twice the usual length of line. This results in a voltage drop, which may mean insufficient power is available and trains are unable to maintain planned speeds. Under normal feeding of 25kV lines, a minimum of about 19kV can be provided, but under emergency feed conditioned voltages below 15kV can occur.

The report discusses a theoretical investigation of capacitor compensation, considering two systems; parallel connected capacitors and series connected capacitors. Compensation is examined with the objective of providing at least 19kV under emergency conditions.

The report concludes that acceptable compensation for a two track line is provided by 800μF capacitors (4Ω each) in both return conductors placed at every second booster transformer (i.e. 6.5km spacing). Attention needs to be given to fault protection since the overhead system can have two impedance conditions.

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