

Behaviour of backfill materials for electrical grounding systems under high voltage conditions

Abstract

Backfill materials like Bentonite and cement are effective in lowering grounding resistance of electrodes for a considerable period. During lightning, switching impulses and earth fault occurrences in medium and high voltage networks, the grounding system needs to handle extremely high currents either for a short duration or prolonged period respectively. This paper investigates the behaviour of bentonite, cement and sand under impulse and alternating high voltage (50Hz) conditions. Fulguritic-formation was observed in all materials under alternating high voltage. The findings reveal that performance of grounding systems under high voltage conditions may significantly change from the outcomes anticipated at design stage.

Keyword: Grounding; Backfill materials; Bentonite; High voltage experiment; Resistance; Fulgurites