IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, December 2024

Electric Pole Safety and Current Leakage Detection

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Abstract: *Leakage current is an important index of insulation performance of electrical equipment. This paper introduces a portable insulation rod leakage current real-time monitoring and alarm device. Combined with the actual scenario of the insulation rod operation method, the insulation rod and current detection and alarm function are integrated. The device can effectively monitor the leakage current on the insulation rod body and give real-time alarm under abnormal circumstances, so as to ensure the safety of the power grid operation without power failure. Through the use of the device, the operator can improve the perception of the rod leakage current, take timely measures to avoid the occurrence of power grid accidents, increase the fault tolerance rate of field operations, and effectively improve the safety of the work site.*

The safety of power distribution infrastructure is a critical concern in modern energy systems. Fallen poles and current leakages can lead to accidents, power outages, and financial losses. This paper reviews technologies and methodologies for monitoring electrical poles and the broader power grid, focusing on systems such as Pole Guard and Safe Grid Monitor. These systems integrate real-time monitoring, fault detection, and safety protocols to enhance grid resilience. Emerging trends, challenges, and future directions in this field are also discussed.

The safety and reliability of power distribution infrastructure are vital for the efficient operation of modern energy systems. Fallen poles and current leakage pose significant risks to public safety, can cause power outages, and lead to considerable financial losses. This paper reviews advanced technologies and methodologies employed for monitoring electrical poles and the broader power grid, with a particular focus on systems such as Pole Guard and Safe Grid Monitor. These systems integrate real-time monitoring, fault detection, and automated safety protocols to enhance grid resilience and prevent accidents. The review discusses various technologies, including IoT-based monitoring, machine learning algorithms for fault prediction, thermal and acoustic sensing, and wireless communication protocols. Additionally, the paper explores the emerging trends in AI, predictive analytics, edge computing, and renewable energy integration. It also highlights the challenges in scalability, reliability, and cybersecurity within power grid monitoring systems. Finally, the paper examines future directions in sensor development, energy-efficient designs, and community engagement, proposing advancements that will drive the evolution of smarter and safer power distribution networks.

Keywords: Leakage current

DOI: 10.48175/568
ISSN 2581-9429 IJARSCT