

中文摘要

接地系統的性能與工作安全，設備安全和保護效能息息相關，由於變電所、發電廠、輸電線路鐵塔的接地系統連接在一起，構成一個互相連接地網路，當電力系統在此網路上發生雷擊或接地故障時，雷擊電流或故障電流將分佈在彼此互連接地網路上，造成各地相關接地系統的地電位湧升及大地環流。為使電力系統供電之穩定與安全，變電所接地系統相對重要，而變電所接地系統的主要目的，除了確保人員的安全之外，並須保護機器設備免於受損。

本論文首先討論大地阻抗量測原理與技術，接著為變電所接地系統之介紹，再以實際在台電公司台南變電所進行量測草地與碎石二種不同地質，以及接地電極不同埋入深度之量測值，透過計算分析來探討地表層鋪設草地或碎石之好壞及接地電極不同埋入深度之差異；最後對變電所接地系統地表層鋪設之不同材質，提出建議，並針對地表層鋪設材質及厚度與人體最大容許步間及接觸電壓之關係，提出安全與效益評估。

英文摘要

Electrical engineers are concerned about the relationship between earthing systems and safety of workmen and equipments. Those who work for substations, power stations and transmission lines also have to take the performance of protection into their consideration. An earthing - mesh in a bulk grid of power system could be vulnerable owing to a lightening strike or an earth-fault occurred accidentally to the system . Due to the current, induced by a lightening strike or a fault , flows into the mesh , a potential rise and an influx of circumambient current could induce a major fault .In order to maintain a safe and stable power supply system and to protect workmen and equipments form being damaged.

This thesis would like to pay more attention on the issue. Firstly , the principle and techniques of the measurement of ground impedance are discussed in this thesis. Then it introduces the current condition of earthing system in substations. Furthermore ,we prompt to measure the ground impedance in Tainan substation based on grass ground and gravel ground respectively. The different depth of electrodes punched into the ground are also considered. Finally, by evaluating and analyzing the different results of measurements, we thus suggest a better selection to the cover layer of switchyard in substation. To assess the maximum allowance between step voltage and touch voltage on human body which is related to the different materials and depth layed on the ground of substations are also discussed in this thesis.