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**DEVELOPMENT OF CLAYS OR MINERALS AS BACKFILL
MATERIALS IN LIGHTNING CONDUCTORS**

A PROJECT REPORT PRESENTED BY

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Clays are being identified as one of the most appropriate backfill materials with a low resistivity for lightning conductors. This is mainly due to their high water retainability. The resistivity of clays can even be reduced by introducing salts or any other conductivity-enhancing substances. However selecting such materials has limitations because decrease in resistivity also relates to an increase in corrosion activity of the copper ground rods, which are used as electrodes of the grounding system.

The conductivity of clays and minerals may be due to both electrons and ions. When soil minerals are exposed to water, exchangeable ions go into solution, forming an ionic halo around the particles. These ions contribute to the electrical conduction.

Locally available clays and some minerals are investigated in this study to use as backfill materials, focusing their resistivity variations with water and salt content. Soil

box method is used because the experiments are to be carried out in the laboratory at room temperature. X Ray Diffraction (XRD) patterns are obtained in order to identify the mineral groups present in the clay. Molecular structures of clays are also studied because they have a considerable influence in water retainability and swelling ability of clays. It has been observed that the lowest resistivity occurred in bentonite clay containing polyaniline (PANI). Bentonite clay particles are fine grained and thin layered and also contain easily exchangeable ions. Being an electronically conducting polymer, polyaniline contributes to electronic conductivity for the composite material.