

An Investigation to Study the Moisture Dependency of Ground Enhancement Compound

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Abstract : Lightning protection consists of three main parts; mainly air termination system, down conductor, and earth termination system. Earth termination system is the most important part as earth is the sink and source of charges. Therefore, even when the charges are captured and delivered to the ground, and an easy path is not provided to the charges, earth termination system would lead to problems. Soil has significantly different resistivities ranging from 10 Ωm for wet organic soil to 10000 Ωm for bedrock. Different methods have been discussed and used conventionally such as deep-ground-well method and altering the length of the rod. Those methods are not considered economical. Therefore, it was a general practice to use charcoal along with salt to reduce the soil resistivity. Bentonite is worldwide acceptable material, that had led our interest towards study of bentonite at first. It was concluded that bentonite is a clay which is non-corrosive, environment friendly. Whereas bentonite is suitable only when there is moisture present in the soil, as in the absence of moisture, cracks will appear on the surface which will provide an open passage to the air, resulting into increase in the resistivity. Furthermore, bentonite without moisture does not have enough bonding property, moisture retention, conductivity, and non-leachability. Therefore, bentonite was used along with the other backfill material to overcome the dependency of bentonite on moisture. Different experiments were performed to get the best ratio of bentonite and carbon backfill. It was concluded that properties will highly depend on the quantity of bentonite and carbon-based backfill material.

Keywords : backfill material, bentonite, grounding material, low resistivity

Conference Title : ICLP 2021 : International Conference on Lightning Protection

Conference Location : Paris, France

Conference Dates : March 29-30, 2021