

## Effect of plasticity characteristics on the electrical resistivity of bentonite

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### ABSTRACT

This paper presents the effect of plasticity and the limit states on the electrical resistivity of bentonite as grounding material. The material used in this study was extracted from Andrassy volcanic formations in Tawau district. The geotechnical properties such as the plasticity characteristic, water content and electrical resistivity of the bentonite were investigated. The electrical resistivity was measured at different limit state of the bentonite using a soil box and a 4-pin resistivity meter. In this study, the Andrassy bentonite showed appropriate composition and technical properties commonly associated in electrical grounding application. Test results indicated that the electrical resistivity is somewhat similar to most bentonites. The resistivity values were found to vary with the bentonite limit state. Water content greatly influences the electrical resistivity of the bentonite. Under dry solid-state, the resistivity is the highest at 11 k $\Omega$ m. Surprisingly, under liquid state, three distinct resistivity values were observed. Under wet conditions, the resistivity were 4500, 180 and 1.8  $\Omega$ m for semi-solid, plastic, and liquid states, respectively. Thus, it is expected that bentonite performance as good grounding enhancement material depends on its wet conditions, mainly when the water content is greater than the plastic limit.

### KEYWORDS

Bentonite; Ground enhancement material; Plasticity; Resistivity

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