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Application of Shallow Seismic Refraction Method and Geotechnical Parameters in Site Characterization of a Reclaimed Land

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Abstract

The recent incessant cases of building collapse have made it necessary for building site to be characterized before they are developed especially when the land is reclaimed from water bodies. On the basis of the above, both geophysical and geotechnical methods are engaged to determine the subsurface structure of a land for construction purposes. In this research effort, near surface seismic refraction method together with relevant geotechnical methods were used to characterize the subsurface condition of the study site. Nine seismic refraction profiles were surveyed with some of the profiles laid parallel and some others overlain one another. The result of this study revealed three geologic layers in the site with varying geotechnical parameters. The Young's modulus, bulk modulus and shear modulus all have values that ranges from 0.071-25.685, 0.083-30.042 and 0.0286-10.395 GPa respectively in the site. From these results, it can be concluded the third layer having the highest value of geotechnical parameters is the most competent and this layer is between 7.5 m and 18 m into the subsurface. The information obtained from other geotechnical methods in the site confirmed the results of this study. Thus, near surface seismic refraction method is recommended for a non-invasive, non-cumbersome and reliable site characterization.

Keywords

Characterization, Geotechnical Parameters, Reclaimed Land, Shallow Seismic Refraction, Subsurface Structure.

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