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## Correlation of Seismic P-Wave Velocities with Engineering Parameters (N Value and Rock Quality) for Tropical Environmental Study

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### ABSTRACT

The physical parameters of the subsurface from the environmental site investigation are important for geoscientists and engineers to understand and very low cost-effective method, especially when combined with geophysical (seismic) and geotechnical (borehole) surveys. These parameters can be estimated from other obtained parameters. In this study, P-wave velocities of materials (soils and rocks) are studied both in the laboratory and field measurement. The obtained P-wave velocities are then compared with the engineering parameters such N values, rock quality, friction angle, relative density, velocity index, density and penetration strength from boreholes. The empirical correlations were also found in this study for selected parameters. The estimation of engineering parameters from P-wave seismic velocity values is applicable for tropical environmental study. It is found that, the ratio ( $V_{FIELD}/V_{LAB}$ ) when squared, was numerically close to the value of percentage RQD. We found that the empirical correlation for tropical environmental study is  $V_p = 23.605(N) - 160.43$  and the regression found is 0.9315 (93.15%). Meanwhile, the empirical correlation between P-wave velocities and RQD values is found as  $V_p = 21.951(RQD) + 0.1368$  and the regression found is 0.8377 (83.77%). The correlation between apparent P-wave velocities with penetration strength for both study sites are found as and the regression coefficient is found as 0.9756. Thus, this study helps for the estimation and prediction the properties of the subsurface material (soils and rocks) especially in reducing the cost of investigation and increase the understanding of the Earth's subsurface characterizations physical parameters.

### KEYWORDS

Geoscientists; Geophysical; N Value; Rock Quality; Environmental

### Cite this paper

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