Geotechnical Foundations in Expansive Soils: Sudanese Practices Applied to Guinea Context

Moussa Camara[1], **Usman Keita**[1]

[1] Gamal Abdel Nasser University of Conakry

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Correspondence: mcamara@gmail.com

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Author notes

Moussa Camara is affiliated with Gamal Abdel Nasser University of Conakry and focuses on Engineering research in Africa.

Usman Keita is affiliated with Gamal Abdel Nasser University of Conakry and focuses on Engineering research in Africa.

Abstract

Expansive soils pose significant challenges for geotechnical engineering in Sudan and other arid regions due to their expansive and contractive behaviour. A comparative analysis was conducted using statistical models to assess soil properties and foundation designs in both regions. The proportion of expansive soil expansion during wet seasons exceeded 10% at critical foundations, necessitating enhanced design considerations for stability. Enhanced foundation designs incorporating expanded soil behaviour predictions are necessary to ensure structural integrity in Guinea's expansive soils. Foundation designers should consider dynamic load testing and incorporate predictive models into their design processes. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geotechnical Engineering, Expansive Soils, Foundation Design, Soil Mechanics, Subsidence Prevention, Stability Analysis, Geosynthetic Reinforcement*

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