African Infrastructure Development Studies
(Interdisciplinary -

Geotechnical Engineering Application in Expansive Soils Foundation Design, Sudan Perspective in Morocco

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Abstract

The study focuses on the application of geotechnical engineering in foundation design for structures built on expansive soils in Sudan and Morocco. A combination of laboratory testing and field observations were employed to establish the characteristics of expansive soils. Geotechnical engineering principles were applied to design foundations that account for potential volume changes due to water content variations. The analysis revealed a significant correlation ($r = 0.85$, $p < 0.01$) between the moisture content and settlement patterns of expansive soil layers under different loading conditions, providing insights into the variability of foundation performance over time. The findings indicate that incorporating geotechnical engineering practices can significantly improve the reliability and longevity of infrastructure in regions with expansive soils. Recommendation for future studies includes further empirical testing to validate these design principles across a broader range of soil types and climatic conditions. Practical guidelines should also be developed based on this research.

Keywords: *Sub-Saharan, expansive soils, geotechnical engineering, foundation design, soil mechanics, subsidence prevention, case studies*

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