



# Geotechnical Foundations on Expansive Soils in Sudan: An African Perspective

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**Published:** 11 December 2008 | **Received:** 29 June 2008 | **Accepted:** 23 October 2008

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**DOI:** [10.5281/zenodo.18870994](https://doi.org/10.5281/zenodo.18870994)

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## Abstract

Geotechnical foundations are critical for infrastructure stability in regions with expansive soils, which can induce significant foundation displacements and settlements. A review of existing literature and field observations was conducted to assess the suitability of standard foundation designs for expansive soil environments. The findings indicate that traditional geotechnical methods often underestimate settlement predictions due to expansive soil behaviour, necessitating a more sophisticated design approach. This study recommends incorporating empirical data in foundation design and suggests using a probabilistic model to account for the variability in expansive soil properties. Engineers should consider implementing adaptive foundations and ongoing monitoring as standard practice when working with expansive soils in similar climatic conditions. The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + v_i \epsilon$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Sub-Saharan, Geosynthetics, Consolidation, In-situ Testing, Pedotransfer Functions, Percolation Theory, Soil Nailing*

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