

Methodology for Geotechnical Foundation Design on Expansive Soils in the Angolan Context

Isabela dos Santos^{1,2}| Maria Chivale^{3,4}
Carlos Kiala^{1,3}

¹ Jean Piaget University of Angola

² Agostinho Neto University, Luanda

³ Department of Civil Engineering, Agostinho Neto University, Luanda

⁴ Instituto Superior Politécnico Metropolitano de Angola (IMETRO)

Correspondence: isantos@aol.com

Received: 06 March 2014 | Accepted: 30 May 2014 | Published: 24 July 2014 | DOI: [10.5281/zenodo.18966341](https://doi.org/10.5281/zenodo.18966341)

ABSTRACT

Background: Expansive soils present a significant geotechnical challenge for foundation design in many regions, including Angola, where seasonal moisture variations cause substantial volume change. Current design codes often lack specific guidance for the unique soil mineralogy and climatic conditions found in the country, leading to either overly conservative or inadequate designs.

Purpose and objectives: This article presents a novel, context-specific methodology for the geotechnical design of shallow foundations on expansive soils in Angola. The primary objective is to provide a systematic procedure that integrates site characterisation, swell prediction, and risk-based design to improve reliability and cost-effectiveness.

Keywords: *Expansive soils, Foundation design, Tropical soils, Geotechnical characterisation, Angolan geology, Unsaturated soil mechanics, Heave prediction*

Article Highlights

- Presents a three-phase methodology integrating site characterisation, swell prediction, and risk-based design.
- Calibrated heave model reduces prediction coefficient of variation to 0.22 using local Angolan data.
- Framework explicitly accounts for parameter uncertainty to balance safety and cost-effectiveness.
- Case study in Huíla Province demonstrates practical utility for raft and pier foundations.

Design Innovation

The methodology moves beyond empirical rules by implementing a limit state design approach that incorporates predicted heave uncertainty, offering a rational alternative to conventional code-based methods.

This article provides a structured design procedure tailored to the mineralogy and climate of Angolan expansive soils.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

REQUEST FULL PAPER

 **Email:** info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We
welcome your submissions!**

Join our community of African scholars and share
your groundbreaking work.

 **Submit at:** app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global
Knowledge