

# Geotechnical Engineering Analysis And Evaluation

EIGE

## Geotechnical Evaluation of Some Lateritic Soils in Akure South, South-western Nigeria

Owolabi, T. A.

Department of Civil Engineering  
Afe Babalola University, Ado-Ekiti, Nigeria  
owolabiti@axoibimbola@yahoo.com

Aderinola, O.S.

Department of Civil Engineering  
Federal University of Technology, Akure  
osaderinola@yahoo.com

### ABSTRACT

This research project aims at evaluating the geotechnical properties of lateritic soil in Akure South, Southwestern Nigeria. In order to achieve this, six samples were collected from two borrow pits for laboratory test. Atterberg limits test, specific gravity test, sieve analysis test, moisture content test, compaction test and California bearing ratio test (CBR) and unconfined compressive strength were conducted on the soil samples in accordance with British standard code of practice (BS1377:1990). Methods of test for soils for civil engineering purposes. The particle size analysis shows that the percentages passing number 200 BS sieve are 13%, 6% and 53% for samples S1, S2 and S3 respectively. Samples S1 and S2 can be deduced as suitable for sub-grade, sub-base and base materials as the percentage by weight finer than NO 200BS test sieve is less than 35%. The Atterberg limit result shows that sample S1, S2 and S3 have sandy particle sizes predominating. Hence the soil sample as a result of its particle size composition happens to be a cohesionless soil with no plasticity. The natural moisture content for the soil samples ranges between 5.26% to 14.72%. The Specific gravity of the tested samples lies between 2.64 and 2.71. The soaked California bearing ratio ranges from 53.30% - 70.85%. The maximum dry density for the soil samples varies between 1.89 Mg/m<sup>3</sup> and 2.314 Mg/m<sup>3</sup> with their optimum moisture content ranging between 6.25% to 17.44% while the unconfined compressive strength for S3 is 53.315kN/m<sup>2</sup>. According to AASHTO soil classification samples S1 and S2 can be classified as A-1b materials (granular material) consist of well graded mixtures of gravel, coarse sand and fine sand and can be rated as excellent material for road works having satisfied all the conditions for constructing subgrade and subbase materials while sample S3 can be classified as A-4 material (silty soil), rated as fair to poor sub-grade material and cannot be used as a construction material. Conversely this research work has provided data for engineers, designers and contractor for the use of this borrowpits for construction work. It is recommended that all contractors should ensure that the testing and quality control of pavement materials is done before the commencement of work on site

**KEYWORDS:** Lateritic soil, particle size analysis test, Atterberg limit test, compaction test, specific gravity, California bearing ratio, soil classification, geotechnical properties

### INTRODUCTION

Lateritic soils are the most common reddish colour weathered pedogenic surface deposits occurring in the tropical and subtropical regions of the world. They constitute the most common materials for the construction of earth dams, highways, embankments, airfields as well as foundation materials to support structures in these areas. (Gidgasu, 1976). Their chemical

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