

ABSTRACT

This research work involves the improvement of the engineering properties of laterite soil by stabilization with quarry dust on fines. The laterite used for this research work will be collected at Osogbo. The sample will be subjected to laboratory tests at the Civil Engineering Department Laboratory Futa, Akura and Osun State Ministry of Works and Transport, Osogbo. The tests will be carried out on both the natural sample and the improved sample and will include: moisture content, specific gravity, grain size distribution, Atterberg's limits, compaction and California Bearing Ratio (CBR) tests both before adding quarry dust and after adding a varying percentage and proportion of quarrying dust. The result of natural sample and improved sample indicate that it could be used to alter and make up for the deficiencies in the particles sizes. If the laterite thereby increasing the potential for use as base material. The result of moisture content is a decrease on the optimum moisture content for laterite cement mixture as the quarry dust content increases. This because the quantity of laterite that contains clayey particles, which requires water for the bonding action is reducing thereby needing less water for hardening. The result on consistency limits decrease in the consistency properties, quarry dust alter, the gradation of the laterite while cement is used to bind the mixture together, which in turn reduces the liquid limit, plastic limit, linear shrinkage of the resulting mixture. The result (CBR) is the clay fraction in the mixture is decreased due to increase in quarry which earlier on was done by the clay fraction at lower percentage of quarry dust on the laterite quarry dust mixtures. The granite in the quarry dust adds strength and rigidity to the mixtures the quantity of the quarry dust increases.

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CHAPTER ONE INTRODUCTION

1.1 BACKGROUND OF THE STUDY

During the last decade, the global demand for indigenous laterite soil has continued to increase. This growing demand has generated interest in the use of red tropical soils for road materials especially in the developing countries. There have been several cases of pavement failures due to poor laterite materials. Hence, it calls for improvement of the engineering properties of laterite soil to improve compressive strength and durability. The red soil which is in abundant supply in Nigeria, poses unique challenges.

The use of this as a road material is encouraged by several advantages such as:

- (i) The vast abundance of this soil
- (ii) The relative cheapness of this soil
- (iii) Reduction in the foreign exchanges used in buying imported road materials
- (iv) It enhances high rate of road construction

Despite the advantages, the use of this soil as a road material has not been fully utilized. This is because there has not been much research into the ways by which the bearing capacity of the soil can be improved. The increasing growth in population and the corresponding increase in demand for road construction in Nigeria during the last two decades have generated increased interest in the ways by which the strength properties of laterite can be improved.

1.2 AIM AND OBJECTIVES

The aim of this project is to assess the effects of quarry dust on the engineering properties of lateritic soil.

The underlying objectives are to:

1. Investigate the natural engineering properties of lateritic soil samples
2. Study the effect of the lateritic soil on the quarry dust
3. Determine the feasibility of using quarry dust as lateritic soil stabilizer
4. Determine the optimum improvement quantity and proportion needed for improving lateritic soil with quarry dust.

1.3 SIGNIFICANCE OF THE STUDY

The need for the study is to provide maximum improvement effects of quarry dust on laterite. It is necessary for civil engineering professionals to know the effect of quarry dust additive on laterite.

Also, a lasting solution may be provided to the constant road failure due to poor grade, sub-base and base

course materials.

1.4 STATEMENT OF PROBLEM

Today, various pavement distresses have been observed on the road due to use of poor lateritic materials for road construction. Researches on the effect of quarry dust (additive) on laterite was only done to a certain extent.

Time restraint is one of the problems impeding detailed research work on the use of quarry dust additive for improving soil. Research work was done to a certain stage due to lack of sufficient time.

1.5 SCOPE OF THE STUDY

The scope of the study essentially centered on the use of quarry dust for improving lateritic soil.

The study is limited only to analysis of lateritic soil collected from Osogbo town. It involves carrying out various laboratory tests such as Atterberg's limit, Compaction and C. B. R test on the soil before and after the addition of the quarry dust.

Effects of quarry dust on the engineering properties of lateritic soil

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