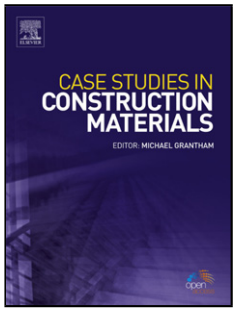

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TitleWater absorption properties of sawdust lignin stabilised compressed laterite bricks

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Initial Rate of Absorption.docx [Manuscript File]

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Abstract

Lignin is reported to have good binding ability with soil particles especially in road construction, however, its application and behavior in compressed bricks is being investigated. The water absorption property of lateritic bricks is essential to its durability as well as its bonding with cement mortar. This study is focused on the determination of the initial rate of absorption and the 45 minutes total water absorption of lignin stabilised compressed lateritic bricks.

Two particle sizes of laterite namely those passing the 2.36 mm BS sieve and those retained on it were stabilised at 4%, 8% and 12% by mass with sawdust lignin extracted through alkaline hydrolysis. Fourier infra-red spectroscopy (FTIR) was used to identify the functional groups present in the lignin additives while the laterite sample was subjected to consistency, physical and mineralogical tests. The tests were carried out in order to determine the likely interaction and mechanism of reactions between the soil particles and the additives. The total water absorption after 45 minutes of full immersion and the initial rate of absorption after 5 and 60 minutes were determined at 14 and 28 days of air curing.

The wood additives showed an improvement in the water absorption properties of the stabilised bricks compared to that of cement stabilised samples. The percentage water absorbed by cement stabilised samples ranges between 6% and 15% which is considered high while that of the wood additives ranges between 2% and 6%.

Keywords: Laterite brick, Sawdust Lignin, Water absorption.

Introduction

The renewed interest in lateritic bricks utilisation as walling material took advantage of its benefits of environmental friendliness, regulation of internal temperature, economy, reduction in embodied energy and heat emission (Lawrence, Heath and Walker 2008). Egenti, Khatib and Oloke (2014) however, noted the limited tolerance of lateritic bricks to acceptable performance evident in the reduced strength in adverse exposure condition (especially high moisture) as a major factor impairing its quality and acceptance as building material in modern times. This is evident in noticeable defects like surface erosion, peeling off of surface finishes