Paper Title:

Influence of Portland Cement Brands and Aggregates Sizes on the Compressive Strength of Normal Concrete

Abstract

A good number of building failures have occurred in Nigeria which resulted in the loss of lives and a lot of these failures are attributed to the poor concrete practices used for the execution of these constructions. These have shown that the concrete technology adopted in Nigeria has some issues and requires urgent attention for development and improvement. This study explored methods of improving concrete practices so as to obtain better qualities structures. The research replicated some of the common concrete practices adopted by the construction industry in Nigeria to obtain the compressive strength of normal concrete. Two types of Portland cement brand, Type A and Type and three aggregate sizes (12.5mm, 19mm and 30mm) together with a mixed-size aggregate were utilized for the research. The concrete produced were tested for compressive strength and compared with test results from sites in Lagos Nigeria. The results showed how cement brands and aggregate sizes influence the compressive strength of normal concrete. The results also proved that the common poor quality concrete verified in Nigeria are not properly prepared.

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Export

Influence of Portland Cement Brands and Aggregates Sizes on the Compressive Strength of Normal Concrete

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Abstract. A good number of building failures have occurred in Nigeria which resulted in the loss of lives and a lot of these failures are attributed to the poor concrete practices used for the execution of these constructions. These have shown that the concrete technology adopted in Nigeria has some issues and requires urgent attention for development and improvement. This study explored methods of improving concrete practices so as to obtain better qualities structures. The research replicated some of the common concrete practices adopted by the construction industry in Nigeria to obtain the compressive strength of normal concrete. Two types of Portland cement brand, Type A and Type and three aggregate sizes (12.5mm, 19mm and 30mm) together with a mixed-size aggregate were utilized for the research. The concrete produced were tested for compressive strength and compared with test results from sites in Lagos Nigeria. The results showed how cement brands and aggregate sizes influence the compressive strength of normal concrete. The results also proved that the common poor quality concrete verified in Nigeria are not properly prepared.

Introduction

Building and construction activities are as old as the existence of man, as man has always required shelter for safety, activities and his comfort. The human habitations through the phases of transition from the primitive age to the current information/knowledge worker age have changed and evolved from caves to huts and houses to skyscrapers and most recently to buildings that respond to environmental stimuli. These structures corresponded to the discovery of dominant construction materials ranging from earth to wood, to stone to concrete, to steel to FRP composites. Of all the known construction materials, concrete remains the most used material worldwide. It is one of the most multipurpose, economically and universally adopted construction materials and the importance cannot be overstated. This is due to the availability of its constituent materials (Portland cement, fine and coarse aggregate and potable water). It is also one of the few construction materials that can be easily produced *in situ* though the quality cannot always be guaranteed. Today, the versatility of concrete have greatly increased [1]. The production of concrete for structural applications comes in a very rudimentary way and its quality varies considerably. Every components of concrete has an enormous effect on the quality such that the general compressive strength is very easily compromised [2].

In Nigeria where building collapse is common, concrete structures are the most collapsed buildings [3]. Due to inconsistent development of concrete technology over the years, many recent concrete construction projects end up poorly [4]. This has led to poor quality concrete structures which remain the major challenges being faced by the Nigerian construction industry today. The major reason concrete is commonly adopted worldwide is the availability of its constituent materials. The production of normal concrete in Nigeria is very attainable as there are cement producing industries and the abundance of aggregates, both fine and coarse. According to a forecast made by the Global Construction Perspectives and Oxford Economic Estimates in June 2010, it was discovered that the Nigeria's construction industry is developing at fast rate and likely to grow at a faster rate over the next decade as it is developing at a rate faster than that of India. The forecast estimated that by 2020, Nigeria's construction industry would enjoy a higher growth rate in terms of