



Comparative Study of the Compressive Strength of Concrete Produced from Different Types of Fine Aggregates.

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Abstract

Concrete is an all-time most widely used construction material due to its ready availability and ease of production. It is made up of water, cement, fine aggregates, and coarse aggregates. Conventional concrete uses river sand as fine aggregate. However, continuous exploitation of river sand over the years as a result of the massive construction works across the globe has resulted in the depletion of the available river sand, creating scarcity of the commodity. This has also resulted in the high cost of the material. To address this concern, Engineers are exploring alternatives for river sand as fine aggregates in concrete making. However, granite chippings are present in many quarry sites across the state constituting a nuisance because it is underutilised. In its case, pit sand is readily available at a relatively cheaper cost in Ilaro and the surrounding areas. This study was aimed at comparing the compressive strength of concrete produced using different types of fine aggregates available in Ilaro and its environment. The comparative results will form a basis for determining whether pit sand can be used as substitute for river sand in the production of concrete.

Materials and Methods

The different types of fine aggregate used for the production of the concrete tested in this study are river sand, pit sand, and granite chipping. The materials used were sourced locally from building material dealers in Ilaro, Yewa South Local Government Area, Ogun State, Nigeria. Laboratory tests were carried out on the three materials to determine their gradation, specific gravity, water absorption, moisture content, bulking, and silt content. A slump test was carried out on the fresh concrete, while the compressive strength test was carried out on the hardened concrete. All the tests were carried out according to the British Standard Code of practice. A total of 12 concrete cubes were cast from each type of fine aggregate and cured for 28 days.

Results and Discussion

Test results on the properties of the three materials are in the range of 2.46 – 2.67, 1.61 – 4.31%, 2.31 – 4.31%, 1.3 – 10.08%, 4.65 - 16.25% and 4.14 – 14.% for specific gravity, water absorption, moisture content, bulking, and silt content respectively. Results of the tests showed that all the materials exhibit true slump ranging from 5mm to 10mm. All the values are low. The compressive strength of concrete made from the three



materials are 25.67N/mm², 21.34N/mm² and 19.12N/mm², for river sand granite chippings and pit sand respectively.

Conclusion

It can be concluded that although the compressive strength of concrete produced using river sand is higher than that of the other two material, all the material are suitable for concrete production.

Key Words: Comparative, Compressive Strength, Concrete, of Fine Aggregates.