**PROJECT PROPOSAL ON EFFECT OF AGGREGATE SIZE ON THE COMPRESSIVE STRENGTH OF CONCRETE**

**BY**

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**INTRODUCTION**

**General background to study**

Concrete has been the most commonly used material in construction which is very versatile in nature and application. It is the second largest material consumed by human beings after food and water as per world’s health organization (WHO). It is a basic civil engineering materials used in most of the civil engineering structures. Its popularity as basic building materials in construction is because of its economy of use, good durability and ease with which it can be manufactured at site. The ability to mould it into any shape and size because of its plasticity in green stage and its subsequent hardening to achieve strength is particularly useful. It is obtained by mixing cement, fine aggregate, coarse aggregate and water in required proportions. The main material which binds the concrete mix together is the Portland cement which is a cementitious material used centuries ago. The mixture when placed in forms and allowed to cure becomes hard like stone. The hardening is caused by chemical action between water and the cement due to which concrete grows stronger with age.

The strength, durability and other characteristics of concrete depend upon the properties of its ingredients, proportion of the mix, the method of compaction and other controls during placing, compaction and curing. Concrete possess a high compressive strength and is usually more economical than steel and is non corrosive which can be made with locally available materials which makes it widely used in all present-day constructions.

Concrete is good in compression and bad in tension, liable to be cracked when subjected to tensile load. In situations where tensile stresses are developed concrete is strengthened by steel bars forming a composite construction called Reinforced Cement Concrete (RCC). However, concrete has low ductility, high permeability and weak against chemical attacks.

**PROBLEM STATEMENT**

Concrete is the most common material in constructions nowadays and itis used extensively from very developed countries to underdeveloped countries inmany aspects.To produce concrete which is strong and durable there is need to investigate the effects of aggregate sizes on the properties of structural concrete so as to establish the aggregate size that will improve the properties of structural concrete. The strength of the hardened concretecontaining different size of aggregates will be observedduring the research.

**AIMS**

* The aim of this research is to investigate the effect of locally available size of aggregates sizes on the compressive strength of concrete.

**THE PROJECT OBJECTIVES**

The objectives of this research are;

* To compare the strength of concrete made with granite of different sizes such as 19mm, and 12.5mm.
* To know the compressive strength of concrete at different ages of curing.

**SCOPE OF STUDY**

Concrete structures deflect, crack, and loose stiffness when subjected to external load. In concrete structures, the mix proportions of the materials of the concrete and aggregate type and size determine the compressive strength of concrete. Effect of varying size of coarse aggregate on the compressive strengths of concrete shall be investigated. Concrete cubes shall be produce in accordance with BS 1881-108 (1983) and ASTM C293 with varying aggregate sizes of 12.5mm and 19mm, and 37.5mm using a standard mold of dimension 150x150x150mm for the concrete cubes. Compression tests will be done to obtain the compressive strength of concrete after 7days, 14days,21days and 28days after the production of concrete cubes.

**JUSTIFICATION**

The results of the study will help to provide sufficient reason of the work done by past authors. It will also help in providing information necessary to compressive strength of concrete made with different size of aggregates.

**LIMITATION**

Limitation to this project is listed as follows:

* The size of the cube samples to be used are 150 mm x 150 mm x 150 mm.
* The specification of the concrete mix ratio is 1:2:4.
* The material to be used in the mix design includes Ordinary Portland Cement (OPC), coarse aggregates (granite), and fine aggregates (sand).
* Aggregate size of 37.5mm, 19mm and 12.5mm granite is to be used.
* The water cement ratio 0.3 shall be constant throughout the study.

**METHODS OF APPROACH**

The project report will be prepared in such a way that it provides in-depth and elaborate information on the research work carried out.

* The introduction will be presented first. The introduction will state the needs for this research work.
* The second chapter will be the literature review on the materials involved. Concrete and its properties and test carried out by past authors.
* The third chapter will contains the material and methodology i.e. describes how the experimentation on the concrete cubes will be carried out.
* The fourth chapter will present the results obtained from the testing of the concrete cubes in Universal testing Machine.
* The fifth chapter will present the view on the conclusion and recommendation on the study.

**MATERIALS**

* Cement (Dangote cement)
* Coarse aggregate (granite)
* Fine aggregate (sand)
* Water

**EXPECTED RESULT FOR COMPRESSIVE STRENGTH AFTER DAYS OF CURING**.

**The table below illustrate aggregate size of 12.5 mm**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age (days) | Average weight (kg) | | | Average density (kg/m3) | | | Average failure load (KN) | | | Average compressive strength (N/mm2) | | |
| 7 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | |  | | |  | | |  | | |
| 14 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | |  | | |  | | |  | | |
| 21 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | |  | | |  | | |  | | |
| 28 |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | |  | | |  | | |  | | |

**Similar table will also be presented for aggregate size of 19mm and 37.5mm.**

**WORK BREAKDOWN**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Activities** | **Duration**  **(week)** | **July** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| 1 | Submission and correction of report (chapter 1 and 2). | 4 |  |  |  |  |  |  |
| 2 | Collection and acquisition of materials needed. | 4 |  |  |  |  |  |  |
| 3 | Carrying out of necessary tests experiment. | 4 |  |  |  |  |  |  |
| 4 | Submission and correction of report (chapter 3). | 2 |  |  |  |  |  |  |
| 5 | Crushing of concrete cubes. | 4 |  |  |  |  |  |  |
| 6 | Submission and correction of report (chapter 4and 5). | 2 |  |  |  |  |  |  |
| 7 | Final submission of report. | 3 |  |  |  |  |  |  |

**COST ESTIMATION**

|  |  |  |
| --- | --- | --- |
| **S/N** | **ITEMS** | **AMOUNT (N)** |
| 1 | Cost of acquiring materials and transport |  |
| 2 | Cost of 1 cubic metre of concrete |  |
| 3 | Cost of constructing concrete mould |  |
| 4 | Cost of labour |  |
| 5 | Cost of crushing concrete cubes |  |
| 6 | Miscellaneous |  |
|  | Total |  |

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