DETERMINATION OF STRENGTH CHARACTERISTICS OF BRICK BY USING GRANITEPOWDER, CONCHSHELL, LIME AND CEMENT

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***Abstract*: The replacement of the natural fine aggregate by granite powder the requirement of land fill area can be reduced and solves the natural sand scarcity problem. The sand availability as fine aggregate at low cost which needs the reason such as alternative materials even it causes saddle to dump the crusher powder ar one plate which causes environmental pollutions. The compressive strength is identified for various percentage and grades of brick by replacement of sand with granite powder.**

In our project going to be done the BRICK has to be cast in the raw material such as lime, granite powder, partial replacement of lime as a CONCH SHELL and partial replacement of GRANITE POWDER as CEMENT with various percentages and to be concluded foe which one is suitable foe construction with feasible for as,

***Keywords*: Granite powder, Conch shell, Lime and Cement**

1. INTRODUCTION

1.1 GENERAL:

In this project is deals about manufactured by using 30 % of cement and replacing fine aggregate by granite powder. The brick size is 225x112.5x75mm. Large quantities of granite powder, collected in manufacturing area.

Atmosphere will not be affected when compared to normal brick manufacturing. So it is used to manufacture to bricks.

1.2 SOURCES OF GRANITE POWDER:

It is residue taken from granite quarry. Due to excessive cost of transportation from natural sources locally available river sand is expensive. Also creates environmental problems of large-scale depletion of these sources. Use of river sand in construction becomes less attractive, a substitute or replacement product for concrete industry needs to be found. Whose continued use has started posing serious problems with respect to its availability, cost and environmental impact? In such a case the Quarry rock dust can be an economic alternative to the river sand. Usually, Quarry Rock Dust is used in large scale in the highways as a surface finishing material and also used for manufacturing of hollow blocks and lightweight concrete prefabricated Elements. After processing fine particles of size less than 4.75 mm is used in this work.

1.3. OBJECTIVES

- To determine the strength characteristics brick.
- To collecting material are lime, granite powder conch shell, and small amount of cement.
- Improve the strength of bricks used in construction.
- Increased use of bricks in masonry construction.
- To analysis the test result.
- To minimize cost and economic.

LITERATURE REVIEW

2.1 GENERAL:

The following studies are used to guide how to manufacturing the bricks by various materials.

2.2 PREVIOUS STUDY

Er. Lakhan Nagpal, Haryana, India (2013) : investigated the possibility of using crushed stone dust as fine aggregate partially or fully with different grades of concrete composites. The suitability of crushed stone dust waste as fine aggregate for concrete has been assessed by comparing its basic properties with that of conventional concrete. Two basic mixes were selected

for natural sand to achieve M25 and M30 grade concrete. The equivalent mixes were obtained by replacing natural sand by stone dust partially and fully. The compressive strength of Quarry Rock Dust concrete is comparatively 10- 12 % more than that of similar mix of Conventional Concrete. The test result indicates that crushed stone dust waste can be used effectively used to replace natural sand in concrete. In the experimental study of strength characteristics of concrete using crushed stone dust as fine aggregate it is found that there is increase in compressive strength , flexural strength and tensile strength of concrete.

Shahul Hameed et al (2012) have done the experiment to study the feasibility of the usage of quarry rock dust and marble sludge powder as hundred percent substitutes for natural sand in concrete. Two sample of M20 mixes were prepared using Grade-43 OPC, one with quarry dust and another by marble sludge powder combination. It was concluded that quarry dust and marble sludge powder combination as fine aggregate in brick was recommended.

Muhit determined that passing from 200 mm sieve is used as cement replacement whereas retaining from 100 mm sieve is used as sand replacement. Cement was replaced with stone dust in percentage of 3, 5, and 7 percent. Similarly, sand was replaced with stone dust in percentage of 15 to 50 with an increase of 5 percent. Test result gives that compressive strength of mould with 35% of sand and 3% of cement replacing dust increases to 21.33% and 22.76% in that order compared to the normal mortar mould at 7 and 28 days for tensile strength which increased to 13.47%.

Ukpata and Ephraim [7] identified the flexural and tensile strength properties compared with those for normal concrete. Hence, concrete proportion of lateritic sand and quarry dust can be used for construction provided the mixture of lateritic sand content is reserved below 50%. Both flexural strength and tensile strength are increased with increase in lateritic content.

3. METERIAL PROPERTIES

3.1 CEMENT

Here the Ordinary Portland Cement (OPC) is used. The grad of the cement is 43. The cement is manufacturing by Ultra-tech cement.

Its used in normal construction to heavy construction. Cement is provided good strength and high durability to the structure.

3.2 GRANITE POWDER

It is defined in common commercial practice to include almost any hard (harder than glass or steel), crystalline stone that accepts a high polish that is marble, limestone, travertine, sandstone or other softer, common stone. See ASTM specification C-119 for another definition of granite.

3.2.1. PHYSICAL PROPERTIES OF GRANITE POWDER

PROPERTY	GRANITE POWDER
SPECIFIC GRAVITY	2.54
BULK RELATIVE DENCITY(Kg/m^3)	1800
ABSORPTION (%)	1.4
MOISTURE CONTENT (%)	NIL

3.2.2. CHEMICAL PROPERTIES OF GRANITE POWDER

CONSTITUENTS	GRANITE POWDER (%)
SiO_2	65.73
Al_2O_3	19.31
Fe_2O_3	1.39
CaO	2.79
MgO	1.47
Na_2O	1.63
K_2O	1.81
TiO_2	NIL
Loss of ignition	0.31

3.3 WATER

The water used for mixing and curing should be clean and free from injurious quantities of alkalis, acid, oils, salt, sugar, organic materials, vegetable growth and other substance that may be deleterious to bricks, stone, concrete or steel. Portable water is generally considered satisfactory for mixing. The Ph value of the water should be not less than 6.

3.4 MANUFACTURING OF BRICKS:

Initially to prepare the mould in size 225*112.5*0.075mm.the mould is consists of the rectangular shape in wooden structure. After to prepare the brick mix proportion.

The water content of the brick mixings is 30% of cement weight. The brick manufacturing is divided into four categories.

3.4.1 CURING

After casting of concrete the brick were stored in moulds for 24hours in moist condition at room temperature and then the moulds were carefully removed. The curing of the cast bricks of the two batches of concrete was carried out.

4. ESTIMATION FOR BRICK:

The estimation cost are based on the public work deportment (PWD)

CALCULATION:

Size of brick (country brick) = 225x112.5x75mm

Volume of brick = 0.00189 m^3

Mix ratio = M_{20}

Weight of granite powder in one brick =

Weight of Cement in one brick = 0.500x(370/50)

= Rs.3.7

Weight of Lime in one brick = 0.300x(100/13)

= Rs. 2.30

Weight of Conch shell in one brick = 0.030x(100/3)

= Rs.1.00

Cost of brick (one brick = Rs. 8.00/-

5. TEST OF SPECIMEN

5.1. COMPRESSIVE STRENGTH TEST

- Three bricks have to be taken for sampling.
- The brick are to be immersed in water for 24 hours at room temperature.
- The bricks are to be taken out from water and the surplus water on the surface of the brick are to be wiped off.
- The frogs and voids in the bed and face of the brick are to be filled with cement morter 30%
- The brick are to be stored under damped gunny bags foe 24 hrs.
- For 7 days,14 days,28 days are to be immersed in water.
- After that, the bricks are to be taken out from the water, wiped off.
- The specimen is than placed between the bearing plates of the compression testing machine.
- The load as to be applied axially at an uniform rate 14 N/mm^2 per minute.
- The load is applied till the specimen fails.
- The observation are to be recorded.
- Load divided by area gives the ultimate compressive strength.
- The average value of the compressive strength of 3 bricks are to computed.

TABLE 5.1.2. COMPRESSIVE STRENGTH TEST

Sr. No	DAYS	Max. compressive Load (KN)
1.	7 days	190.1
2.	14 days	215.7
3.	28 days	241.2

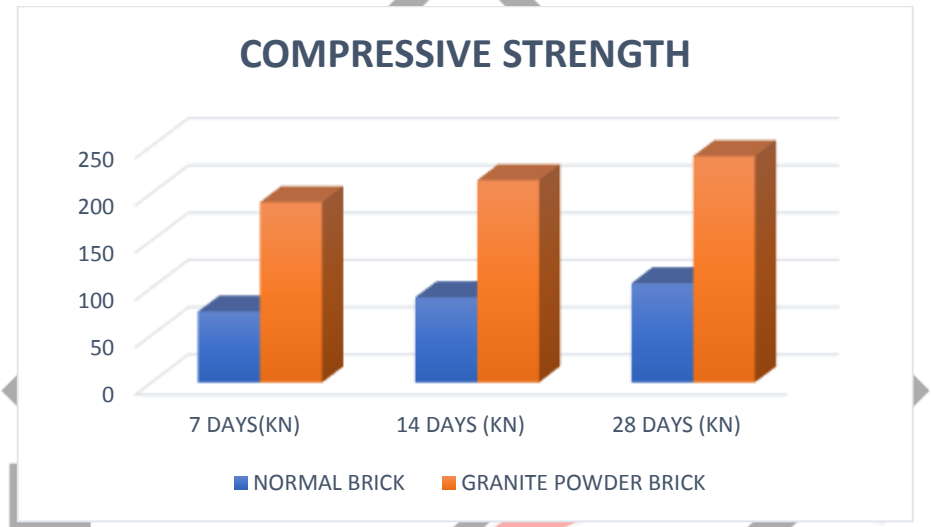
5.2 WATER ABSORPTION TEST COMPOSITE BRICK

- Select three bricks from sampling.
- Dry them in a ventilated oven at 105 to 110 till they attain practically constant weight.
- Remove the bricks from the oven and cool them to room temperature.
- Weight all the bricks individually in a balance and le it be W1 kg.
- Immerse the 3 bricks in water completely for a period of 24 hrs.
- The weight the wet brick let it be w2 kg.
- The difference (W2-W1) in weight indicates the amount of water absorbed by each brick.

Sr.No	size of brick(mm)	dry wt of brick W_1(kg)	Wet wt of Brick W_2 (kg)	Weight of water absorption w=(w2w1/w1)x100 (%)
1.	225x112.5x75	3200	3400	6.25
2.	225x112.5x75	3300	3550	7.70
3.	225x112.5x75	3350	3600	7.65

6. TEST RESULT

COMPREESIVE STRENGTH TEST



WATER ABSORPTION TEST

DAYS	WATER ABSOEPTION (%)
7 DAYS	6.45
14 DAYS	6.89
28 DAYS	7.00

EFFLORESCENCE TEST

The presence of soluble salts in a brick result in the alkali reaction in the brick. The formation of while precipitate in the brick due to reaction with water is proof of the presence of salts in the brick. There is only a little amount of salt in our brick which result in the brick being a good quality brick.

SOUNDNESS TEST:

In this test, the two bricks are taken and they are struck with each other. The bricks should not break and a clear ringing sound should be produced .the glasses are mainly used to resist the sound from surrounding area.

In this project the crusher wastes are also resists the sound. Mainly this bricks are used to the factories, industrial, etc., the soundness test result of the project 32 decibel.

HARDNEES TEST:

The performed by making a scratch on brick surface with the help of finger nail. If no impression is left on surface, the brick is considered to be sufficiently hard.

The metals handbook defines hardness as ‘Resistance meta to plastic deformation, usually by identation. However, the term may also refer to stiffness or temper or to resistance to scratching, abrasion, or cutting.

It is property of a metal , which gives it the ability to resists being permanent, deformed (bend ,broken ,or have its shape changed) , when a load is applied. The greater the hardness of the metal, the greater resistance it has to deformation

CONCLUTION

This study showed that brick waste was not only able to be utilized in brick products but also benefits production by reducing soil stabilization. There was small difference between normal bricks and brick grinding being utilized in brick product. In this project will be appear on economically and available materials are used only. Its also eco friendly. The brick is also known as the granite waste powder brick. The strength is very more in compare to the normal brick. Also it has more strength and durability when compared to the normal brick. The granite waste powder brick have a less water absorption when compare to normal brick. So its van be water retaining structure, underground structure, etc.

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