

# An Experimental Study on Bricks Using Quartz Stone Powder, Clay With Cement

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**Abstract-** A new approach to the production of brick was carried out by using Quartz stone powder. Quartz stone and cement industry has grown significantly in the last decades with the privatization trend in the early 1990s. Accordingly, the amount of mining and processing waste has increased. Stone waste is generally a highly polluting waste due to both of techniques, which impose a health threat to the surroundings. Brick its highly alkaline nature, and its manufacturing and processing is one of the most common masonry units as a building material due to its properties. Many attempts have been made incorporate wastes into the production of bricks, for examples, quartz stone dust, cement, clay. Recycling such wastes by incorporating them into building materials is a practical solution for pollution problems. This paper represents the utilization of stone waste in manufacturing quartz stone bricks with Cement and Clay.

**Keywords-** Quartz stone powder, nature resources, class clay, construction bricks, sustainability, environment, waste reuse, cost feasibility

## I. INTRODUCTION

Brick is an at vital requirement of construction of material. In this demand of clay we try to replacement of the manufacturing sand and making a quartz stone brick. It is a waste material and to produce by a from stone powder generation. It is creating severe environmental pollution. So much research is being conducted from more than two decades for its proper utilization in cement and brick production as well as to control environmental pollution in the surroundings areas of the power plant .Using quartz stone to make bricks instead of cement and clay reduces greenhouse gas and slows down global warming, because large amount of carbon dioxide is produced for manufacturing cement and clay bricks production much energy burned by fossil fuel. The quartz stone powder particles are spherical and same fineness as cement so that silica is readily available for reaction. Quartz stone powder generally white in colour, abrasive mostly alkaline and factory in nature. The pozzalanic properties and clay binding capacity of quartz stone powder makes it useful for its production of brick, cement and concrete. Quartz stone brick are more strength and economical alternation to

convention burnt clay bricks. Due to high availability and excellent properties presently in Indian sceneries quartz stone powder is utilized in different sectors such as cement manufacture, substitution, road and embankment, low lying area filling brick manufacturing. It exhibits excellent physics chemical properties including low density, micro porosity, high surface, hardness

## SCOPE OF OUR PROJECT

1. The reduce the co emissions of quartz stone bricks.
2. To control the environment pollution and remove waste nature quartz stone on agriculture land.
3. The disposals of wastes are causing so many problems effects are affected on human and animals.

## OBJECTIVE

1. The main target of this study is to analyze the nature free cementations material, various properties and their effect on nature brick.
2. The efficient usage of waste quartz stone in brick has resultant in effective usage of nature brick and thereby can solve the problem of safe disposal, also avoid its wide spread littering
3. A present study aims at evaluating the performance of nature eco-friendly brick use in pavement and other application areas.
4. The brick natural eco -friendly limit state process, by green building and environment less into quartz stone powder bricks.

## II. METHODOLOGY

- Literature collection and study
- Material study and collection
- Material properties
- Mix proportion
- Casting of specimens
- Testing on specimens
- Result and discussion
- Conclusion

- Reference

**III. MATERIALS**

**3.1.CEMENT**

**Table 3.1 Physical properties of cement**

S.NO	Test for cement	Value obtained
1.	Consistency	33%
2.	Specific gravity	2.92
3.	Initial setting time	55min
4.	Final setting time	350min
5.	Fineness by sieving	1%
6.	Soundness	1.5mm

**3.2.CLAY**



**Figure 3.2 Clay soil**

**Table 3.2 Physical properties of clay**

S.NO	Test for clay	Value obtained
1	Color	Dark grayish
2	Liquid limit (%)	33.3
3	Plastic limit (%)	19.2
4	Plastic index (%)	14.1
5	Moisture content (%)	14.2

6	Gravel (%)	1.2
7	Sand (%)	6

**3.3 QUARTZ STONE POWDER**



**Figure 3.3 Quartz stone powder**

**Table 3.3 Physical properties of quartz stone powder**

S.No	Test for quartz stone	Apparatus	Value obtained
1	Fineness modulus	Sieve	2.38
2	Specific gravity	Pycnometer	2.65
3	Water absorption	Flask	1.26

**IV. MIX PROPORTION**

**4.1 Brick mix proportion**

Proportioning of raw materials is an important aspects of ensuring quality of earth quartz stone bricks .the proportion will depend on the quality of the raw material.

**Table 4.1.1 Mix proportion**

Proportion	Quartzs and (%)	Cement (%)	Clay (%)
<b>I</b>	50	25	25
<b>II</b>	50	20	30
<b>III</b>	50	15	35

IV	50	10	40
V	50	5	45
VI	50	0	50

**Table 4.1.2 Quantity of material used**

properties	Quartz sand(kg)	Cement (kg)	Clay (kg)
1	1.72	0.85	0.85
2	1.72	0.75	0.90
3	1.72	0.65	0.95
4	1.72	0.55	1.00
5	1.72	0.45	1.05
6	1.72	0.35	1.10

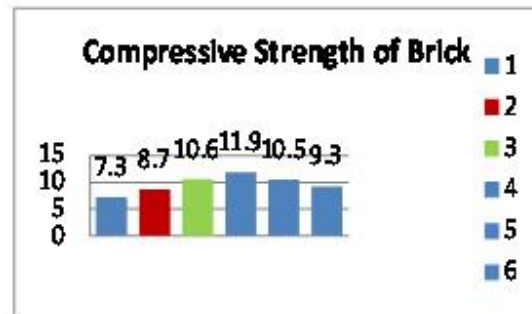
**V. TEST ON SPECIMEN**

**5.1 COMPRESSIVE STRENGTH TESTS**

Compression tests are used to determine a materials behavior under applied crushing loads. And are typically conducted by applying compressive pressure to a test specimen using platens or specialized fixtures on a universal testing machine.

**Table 5.1 Compression strength test**

Proportion	Compressive strength(N/mm <sup>2</sup> )
I(25%Clay)	7.3
II(30%clay)	8.7
III(35%clay)	10.6
IV(40%clay)	11.9
V(45%clay)	10.5
VI(50%clay)	9.3



**5.2 WATER ABSORPTION TEST**

Normally the bricks are water absorption 12% to 20%. In engineering the bricks are closer to 12% is better result, when the water absorption is too low i.e. below 12%, it may be difficult to obtain a proper bond between the mortar and the brick.

**Table 5.2 Water absorption brick**

Proportion	Water absorption (%)
I(25%Clay)	12.5
II(30%clay)	11.47
III(35%clay)	10.04
IV(40%clay)	9.38
V(45%clay)	8.89
VI(50%clay)	7.91

**5.3 EFFLORESCENCE TEST**

Efflorescence is a whitish crystalline deposit on surface of the bricks. Usually magnesium sulphate, calcium sulphate and carbonate of sodium and potassium are found in efflorescence. The movement of ground water into the foundation of the buildings and by capillary action into bricks is very often the cause of efflorescence.

**VI. RESULT**

In the efflorescence test, the amount of efflorescence is NIL.

**VII. CONCLUSION**

From the result obtained from the studies the following conclusions can be drawn:

The strength of the specimen of brick was summarized. The brick test is depended on the materials used for the brick proportions with replacement of fine aggregate as nature earth land stone waste material. In general the strength was increased with percentage of waste replacing of normal brick. From the experimental investigation we found that the compressive strength of 40 % clay with cement 10% gives the maximum strength of 11.90N/mm<sup>2</sup>. In this brick is more than the normal brick all the air voids can arrest by the cracks to the brick. The cost of brick cost is reduced. If the environmental pollution are reduced to direct and indirect manner. The method used to reduce the nature earth stone and safe disposal. To control the global effects and environmental pollution.

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