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EXPERIMENTAL INVESTIGATION USING LIME, GRANITE DUST, FLY ASH IN BRICK MANUFACTURING

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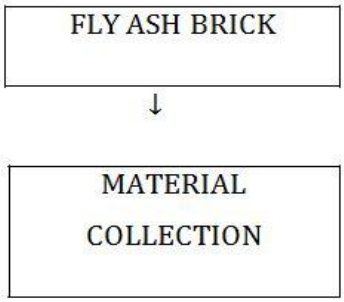
ABSTRACT: Construction industries are the backbone for infrastructure development in India. The various by-products produced from industries causes& pollution in India. It has a major impact in the healthier environment of the Nation. The combination of fly ash bricks have different percentage of the fly ash ,granite dust and Lime 60:25:15, 60:30:10, 70:20:10, 65:25:10 and 70:25:5. In the testing of bricks there are main two types of the testing is done compressive strength test and water absorption test after 7,14,21 days.

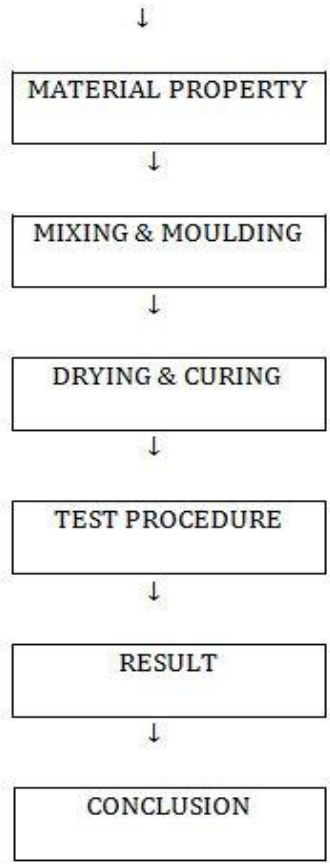
I. INTRODUCTION

Energy requirements for the developing countries in particular area get energy from coal. The disposal of the increasing amounts of thermal waste from coal-fired thermal power plants, this disposal of the thermal waste is called fly ash. Fly ash is composed of the non-combustible mineral portion of coal consumed in a coal fuelled power plant. Fly ash is a powdery substance obtained from the dust collectors in the electrical power plants that use coal as fuel. There are two basic type of fly ash Class F and Class C. Granite cutting industry produces solid waste in large amount and across large areas, which are expected to increase as the construction industry grows, owing that the overall production of granite industry has been increasing rapidly in recent years. It is a non-biodegradable waste that can be easily inhaled by humans and animals and is also harmful to the environment. Sludge lime being another construction waste is obtained as a residue after the hydration of lime. These wastes have been incorporated effectively into the construction industry in the form of an alternative. The usage of fly ash and granite dust for making bricks is ecologically advantageous as it helps in saving top agricultural soil as well as meets the objective of disposing these wastes which otherwise are pollutants.

II. METHODOLOGY

Fig .1. shows the methodology adopted this study





III. MATERIAL PROPERTIES

3.1.FLY ASH :

Fly Ash is a by-product of the combustion of pulverized coal in electric power generation plants. This ash has pozzolanic properties. In the presence of water and free lime, the ash will react into cementitious compounds.

3.2.GRANITE DUST:

Granite is a material used indoor flooring.

The industry's disposal of the granite powder material, consisting of very fine powder, today constitutes one of the environmental problems around the world. major waste generating industries is the granite quarry and production industry by which around 70% of this precious mineral resource is wasted in the mining, processing, and polishing procedures.

3.3.LIME:

Lime is a calcium containing inorganic material in which carbonate, oxide and hydroxide predominate. In the strict

sense of the term lime is calcium hydroxide. Lime is used in building materials is broadly classified as pure, hydraulic and poor lime can be natural or artificial and may be further identified by its magnesium content such as magnesium lime.

IV. DESIGN MIX

Table 1(mix propotion)

Samples	Fly ash %	Granite dust%	Lime %
S1	60	25	15
S2	60	30	10
S3	70	20	10
S4	65	25	10
S5	70	25	05

V. EXPERIMENTAL RESULTS

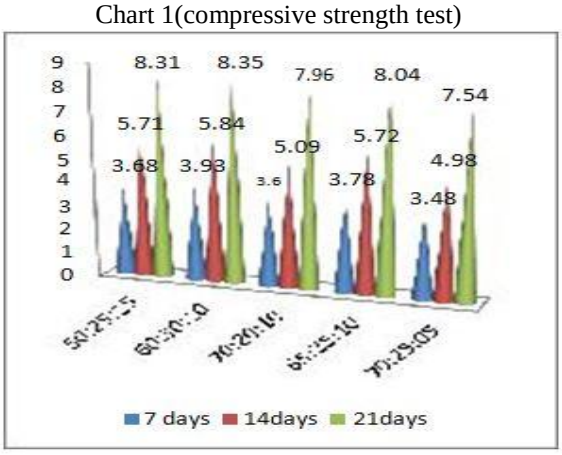
5.1.COMPRESSIVE STRENGTH:

The brick were tested for their compressive strength after 7,14 and 21 days of curing. The brick were tested in the in the testing machine by providing two of 6 mm thick iron plate, one below and one above the brick to allow uniform distribution of load on the brick.

Table 2(Compressive strength test)

Bricks sample	Compressive strength of the bricks			
	7 days (N/mm²)		14days (N/mm²)	21days (N/mm²)
1	3.68		5.71	8.31
2	3.93		5.84	8.35
3	3.6		5.09	7.96
4	3.78		5.72	8.04
5	3.48		4.98	7.54

Chart 1(compressive strength test)



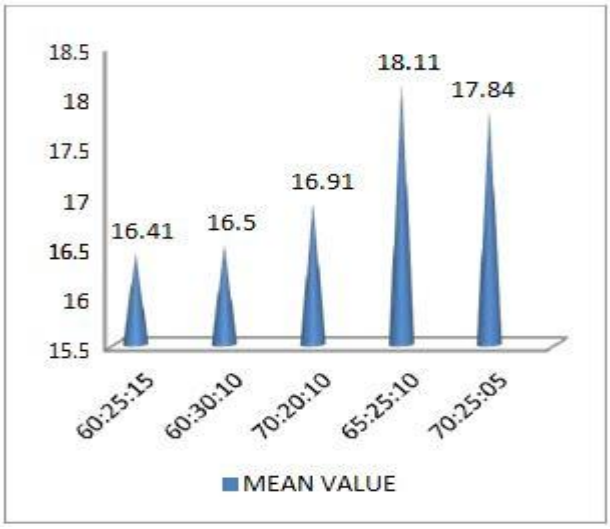
5.2.WATER ABSORPTION:

In the water absorption test procedure first dry the brick and obtain the weight then after a brick is put in the water pond for 24 hours. After 24 hours bricks are removed from water and after 3 minutes the weight of the bricks is measured.

Table 2(Water absorption test)

Bricks sample	Water absorption test result in %			
	Sample 1	Sample 2	Sample 3	Mean value
1	16.89	16.40	15.63	16.41
2	16.74	16.64	16.13	16.50
3	17.37	17.06	16.32	16.91
4	18.86	18.12	17.31	18.11
5	18.28	17.91	17.35	17.84

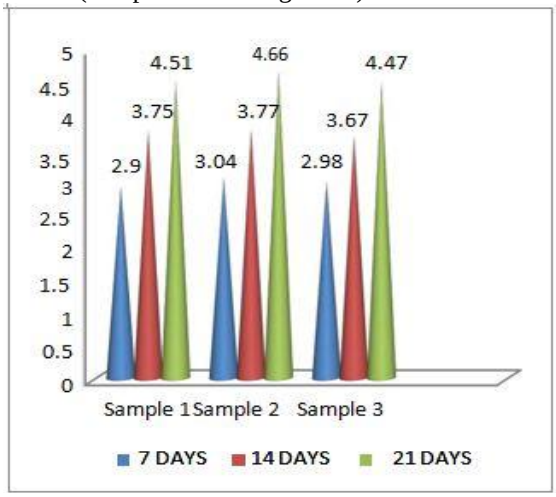
Chart 2(water absorption test)



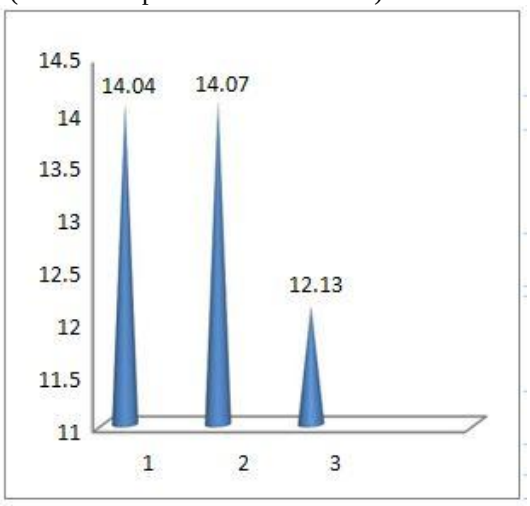
5.3.CONVENTIONAL BRICK:

5.3.1.COMPRESSIVE STRENGTH:

Chart 3(compressive strength test)



5.3.2.WATER ABSORPTION:
Chart 4(water absorption test in soil brick)



VI. CONCLUSION

- Maximum Compressive Strength was attained when the percentage of Fly ash and Granite dust were 60 and 30 respectively for methods of immersed curing.
- Water Absorption Capacity of these Bricks are relatively higher when compared to the Clay Bricks.
- Fly ash-Granite Dust Bricks prove to be Energy efficient, lower in cost.
- Thus it is observed that the industrial waste materials can be successfully used in a brick for the replacement of conventional bricks.

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