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STRENGTH PERFORMANCE OF MODIFIED BRICKS

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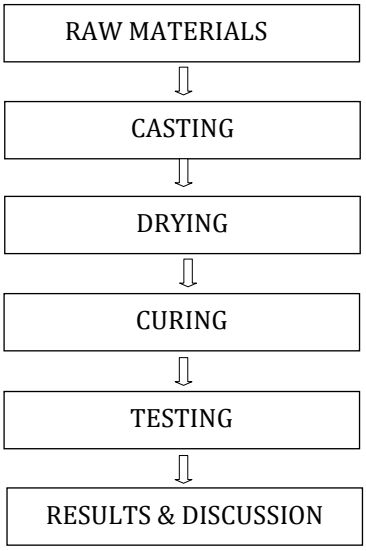
Abstract - *An effort for an alternate approach in manufacture of brick is accomplished by using industrial byproducts like granite slurry, jute fibre. In India granite industries are generating granite slurry in large quantities. Majority of people prefer burnt bricks for construction purposes. The granite slurry has been accepted as building material in many countries for past three decades. The modified bricks of size 190X90X90mm for varying mix proportion of cement, sand, granite slurry, gravel and jute fibre are casted and tested. water absorption test and compressive strength test after 7,14,21 days were carried out.*

Key Words: Granite slurry, Jute fibre, strength test, Modified brick.

1. INTRODUCTION

Bricks remain one of the most important building material in the country. Brick making is a traditional industry in India, generally confined to rural areas. 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 environment. The usage of granite slurry for making bricks in ecologically advantageous as it helps in saving top agricultural soil as well as meet the objective of disposing these wastes which otherwise are pollutants. In this project, an attempt is made experimentally to investigate strength performance of modified bricks and their strength is compared with conventional bricks

2. METHODOLOGY



3. MATERIAL PROPERTIES

3.1 Granite slurry

Granite slurry is obtained from crushing process during quarry activities. Granite fines or rock dust is a byproduct obtained during crushing of granite rocks and it is also granite slurry. *Granite* slurry is used as the partial replacement for cement in concrete. It has the same properties of cement and confirming to zone II is used. It posess the specific gravity of 2.5.

3.2 Jute fibre

Jute fibre is strong but low extensible fibre , structure with highly oriented long chain molecules. The treatment is done by jute fibre were cut into lengths of 40mm and swollen using NaOH solution (10% and 5%) for 1hr at 0 degree Celsius. The fibres were then exhaustively washed in distilled water to remove alkali and again dried to constant weight in circulating air at 100 degrees Celsius. Aspect ratio of jute fibre is 3.3.

4. DESIGN MIX

Table -1: mix proportion

SAMPLES	CEMENT	SAND	GRAVEL	GRANITE SLURRY	JUTE FIBRE
CONVENTIONAL BRICK (C1)	20%	40%	40%	-	-
SAMPLE 1 (S1)	10%	10%	50%	30%	-
SAMPLE 2 (S2)	10%	10%	40%	30%	10%

5. EXPERIMENTAL INVESTIGATION

5.1Compressive Strength

The bricks were tested for their compressive strength after 7,14,21 days of curing

Table -2: Compressive Strength test.

DAYS	CONVENTIONAL BRICKS (N/mm²) C1	MODIFIED BRICKS (N/mm²)	
		S1	S2
7	5.7	6.8	6.9
14	6.8	8.9	9.2
21	7.6	11.2	11.8

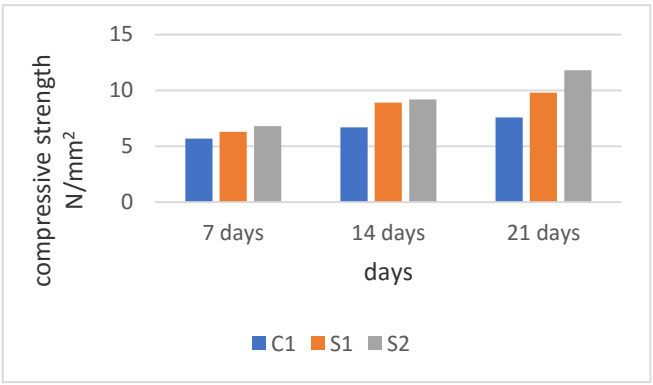


Chart -1: compressive strength test

6. WATER ABSORPTION

In the water absorption test the procedure is to dry the brick and observe the weight, then the brick is immersed in the water for 24 hours. After 24 hours bricks are removed from water and after 3 minutes, the weight of the bricks is observed

WATER ABSORPTION = (W2 -W1)/ (W1) X 100

Table -3: Water absorption test

SAMPLES	WATER ABSORPTION (%)	
CONVENTIONAL BRICK (C1)	8.85	8.30
	8.60	
SAMPLE 1 (S1)	8.80	9.06
	9.35	
SAMPLE 2 (S2)	9.54	9.70
	9.92	

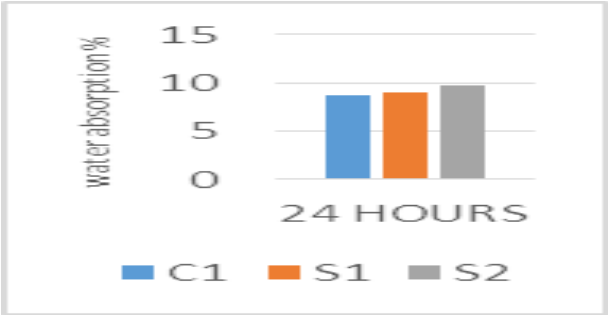


Chart-3: water absorption test

Table -4: Test Result Comparison

Description	Conventional bricks	Modified bricks	Results
Colour	Grey	Grey	Good appearance
compressive strength	5.7-7.6 N/mm²	7-11.8 N/mm²	Higher load bearing capacity
Water absorption	9-10%	8-11%	High water absorption
Weight density	20.26kN/m³	22.54kN/m³	Higher density

9. CONCLUSION

[1]. Maximum compressive strength is obtained when 30% of granite slurry and 10% of jute fibre is added in modified bricks and these bricks gives higher strength when compared to conventional bricks. The modified brick gives 40% of increase in compressive strength when compared to conventional brick.

[2]. Due to bonding nature of granite slurry and high flexural strength of jute fibre, the modified bricks reveals high compressive strength. The modified bricks gives 11.8N/mm^2 of compressive strength it is much higher when compared to conventional brick.
[3]. Water absorption capacity of these bricks are relatively high due to addition of jute fibre which has high water absorbing capacity.

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