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EXPERIMENTAL INVESTIGATION ON CLAY BRICKS BY USING WOOD SAW DUST

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Abstract - *The block could be a artifact, that is employed to create up the structures. The aim of this project is to work out the compressive strength and alternative characteristic of the blocks. The blocks with clay and Wood sawing powder waste, which is able to provides a higher understanding on the properties of blocks like compressive strength, water absorption and size and form of block was smart whereas examination the opposite reasonably blocks. The scope of this project is to work out and compare the strength of the blocks by victimisation completely different proportion of clay and Wood sawing powder waste. The investigation was administrated by varied combine quantitative relation victimisation the laboratory check likes compression check, water absorption. For strength characteristics, the results showed that a step by step increase in compressive strength, water absorption values in blocks was smart whereas examination the characteristics compressive strength of blocks.*

Key Words: Internet of Things (IoT), Gas sensor, Smoke sensor, Humidity sensor, Aruino Uno, Blynk, Smart phone app.

1. INTRODUCTION

With the rise of construction materials prices like cement, steel and timber don't seem to be spirited to create these homes on a good budget. Alternatives through victimization the industrialised Building Systems (IBS) need to be wanted and therefore the government has been pressing the development trade to use IBS for his or her comes. Comes victimization the IBS are going to be completed quicker thus reducing construction completion time and cut the value of workforce to quite. Sustainability practices will enhance the price reduction in construction. The subsequent property practices is achieved like by mistreatment Clay, Wood Sawing Powder Waste With oxide Fume as Clay replacement. Disposal of Wood Sawing Powder Waste could be a major downside in Wood Factories. Reusing of Wood Sawing Powder Waste could be a smart different to resolve the matter of disposal of Wood Sawing Powder Waste. The employment of Wood Sawing Powder Waste for the assembly of bricks could be a well-known truth and is gaining quality day by day.

2.MATERIAL USED

- Clay & Red Soil.
- Wood Sawing Powder.
- Silica Fume.

This soil is poor in lime content and hence it is more acidic. It is basically red in color because of the presence of iron oxides.

Clay Soil

Clay may be a reasonably material that happens naturally and consists of terribly fine grain material with terribly less air areas. Thanks to this it's tough to figure with this soil, as a result of the voidance during this soil is low. Hence, there's potential for water work to occur, which may damage the roots of the plant. Clay soil becomes terribly significant once wet and if cultivation must be done, organic fertilizers ought to be additional to the soil. Clay soil is made when years of rock disintegration and weathering. It's additionally fashioned as substance deposits when the rock is worn, worn and transported. Clay soil because of its formation method is made in mineral content. The varied forms of soils found in Asian country square measure mentioned below-

Red Soil

It is the soil of the tropical regions of the country. This typical soil is found in those regions that receive serious downfall. Red soils ar well developed within the southern region of Western Ghats and Orissa`s japanese Ghats. This soil contains least wet content. Red Soils ar principally found on the upland within the east spreading partially over state and Madras, components of Chhota nagpur and Meghalaya.

Wood Sawing Powder

The Wood stone trade generates differing types of waste. Solid waste and stone suspension, wherever as solid waste is resultant from rejects at the time of cutting or at the process unit. Stone suspension may be a semi liquid substance consisting of particles originated from the sawing and sharpening method and water accustomed cool and lubricate the sawing and sharpening machines. The suspension is keep in tanks for evaporation. To conserve water the suspension is versed filtration and suspension compacting machine. The compacted Wood fine cakes square measure transported and disposed in landfills. Its water content square measure

drastically reduced (Approx 2%) and therefore the Wood fines ensuing from this can have environmental impacts. The stone suspension generated throughout the process are around four-hundredth of the ultimate product. doing away with compacted Wood fine suspension cakes may be a major drawback anyplace. The factories were use to dispose these Wood fines around their own factories. These factories square measure settled terribly about to the residential areas.

Silica Fume

Silica fume (SF) is associate inorganic waste product that is generated throughout the fundamental chemical element and ferro-silicon alloy production. Thanks to the distinctive properties, it's used in many industries. However, little info is accessible on the employment of potential silicon dioxide Fume in ancient clay brick trade. During this study, the result of various quantities of silicon dioxide Fume addition on the properties of pink-slipped clay brick was investigated. take a look at samples were made by uni-axial pressing and pink-slipped at 800oC, 900oC, 1000oC and 1100oC.

3. METHODOLOGY

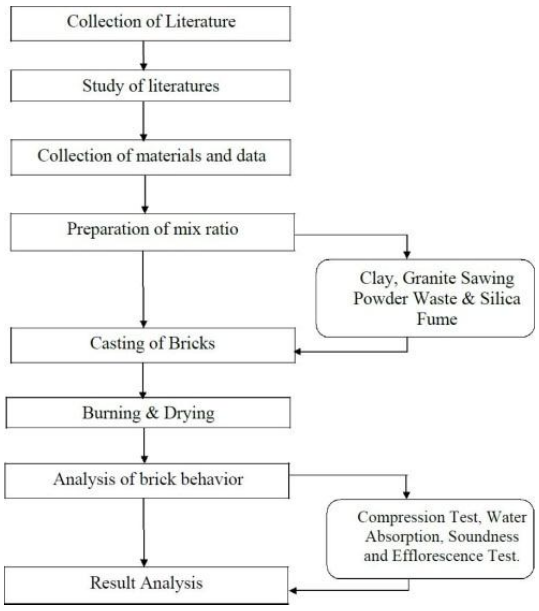


Fig Methodology Chart

2.1 MIX DESIGN

For producing the bricks, most of the machine makers counsel the subsequent 2 combine quantitative relation, we will opt for profitable combine quantitative relation to survive within the market if we tend to face low availableness of Wood sawing powder. At a similar time we must always maintain the standard too.

MIX PROPORTION

A variety of bricks are developed throughout the past years, differing in form and size, counting on the desired strengths and uses. Our brick size ar standard and rectangular is (228 mm x 102 mm x 82 mm) and having the following mix proportions.

Length of brick= 228 mm

Breadth of brick= 102 mm

Height of brick= 82 mm

Table 4.1 Mix Proportion for Standard Brick (%)

Material	Silica	Alumina	Lime	Iron oxide	Magnesia	Total
Ratio (%)	60	30	4	5.5	0.5	100

Table 4.2 Mix Proportion for Bricks with Wood sawing powder waste & silica fume (%)

S. No	Mix	Clay	Wood Sawing Powder Waste(WSP)	Silica Fume(SF)
1.	Mix 1	50	45	5
2.	Mix 2	50	40	10
3.	Mix 3	50	35	15
4.	Mix 4	50	30	20

3. EXPERIMENTAL INVESTIGATION & RESULTS AND DISCUSSIONS

The present chapter of this study, the distinction between the experimental results and therefore theoretical values was mentioned supported the results obtained from the analysis of tests conducted on the quality bricks and the bricks with Wood sawing powder waste with silicon dioxide fume.

RESULTS AND DISCUSSIONS

For the tests that had been done on the bricks, several statements could be made

1. Compressive Tests on Bricks

During the compressive tests on the bricks, failure may well be seen occur on the horizontal middle axis of 4 sides of the bricks. The perimeters of the bricks were broken off within the type such many layers were being bare-assed faraway from the perimeters of the bricks supported the results obtained and observation done throughout the tests. Once loading was applied onto the specimens. The surfaces were broken off and got into crack at the center of the bricks. Figure 6.1 shows the brick with crack. The characteristic

compressive strength of the bricks obtained was four.2N/mm²

Table.2.6 Compressive Strength for Mix 1

Trial No	Initial Crack		Final Crack		No of Specimens
	Load in KN	Stress In N/mm²	Load in KN	Stress in N/mm²	
1	46	1.98	181	7.78	10
2	49	2.11	183	7.87	10
3	49	2.11	183	7.87	10

Table.2.7 Compressive Strength for Mix 2

Trial No	Initial Crack		Final Crack		No of Specimens
	Load in KN	Stress In N/mm²	Load in KN	Stress In N/mm²	
1	38	1.64	171	7.35	10
2	38	1.64	172	7.40	10
3	41	1.76	174	7.48	10

Table.2.8 Compressive Strength for Mix 3

Trial No	Initial Crack		Final Crack		No of Specimens
	Load In KN	Stress in N/mm²	Load In KN	Stress in N/mm²	
1	30	1.29	153	6.58	10
2	32	1.38	154	6.62	10
3	33	1.42	152	6.54	10

Table.2.9 Compressive Strength for Mix 4

Trial No	Initial Crack		Final Crack		No of Specimens
	Load in KN	Stress in N/mm²	Load in KN	Stress in N/mm²	
1	38	1.64	171	7.35	10
2	38	1.64	172	7.40	10
3	41	1.76	174	7.48	10

2. Water Absorption Limit:

From perceptive the Water Absorption Limit for bricks having completely different combine proportions, the dried brick was immersed fully in clean water at temperature of 27+2°C for twenty-four hour. This WSP & SF brick once tested in accordance with the procedure set down in IS 3495 half II-1976. The subsequent table half dozen.5 shows the results obtained from the water absorption limit of blocks.

Table.2.10. Water Absorption Limit of Bricks.

Samp	Weight of Dry Bricks	Weight of Soaked bricks for 24 hours	Water Absorption Limit
	(M_1) in Kg	(M_2) in Kg	in %
M 1	3.62	3.81	7.18
M2	3.62	3.92	8.28
M3	3.62	4.01	10.77
M4	3.62	4.10	13.26

SUMMARY

Based on the discussion on results obtained, the optimum replacement level of Wood sawing powder waste and silicon oxide fume as clay was found and from the compressive strength check, it absolutely was determined that the brick victimisation Wood sawing powder and silicon oxide fume as clay provides additional or less compressive strength because the traditional brick. From the water absorption check, it absolutely was found that the brick victimisation Wood sawing powder waste and silicon oxide fume as clay have additional or less same water absorption limit.

4. STATISTICAL ANALYSIS

GENERAL

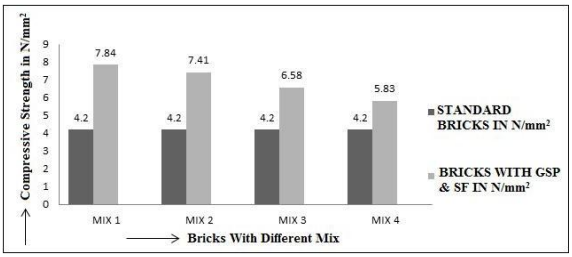
The study presents the results obtained from the experiment testing done on the quality bricks and therefore the bricks Wood sawing powder waste and oxide fume. Analysis was done on the results obtained and bestowed them within the additional applicable formats, like tables, charts or statements. Comparison among the results was additionally in deep trouble the aim of analysis.

STATISTICAL ANALYSIS

Based on many past researches, a number of the properties of the bricks (bricks with Wood sawing powder waste and oxide fume) that needed within the calculation for the compressive strength and water absorption may be obtained. The properties obtained and different needed data was obtained from the results of experiment.

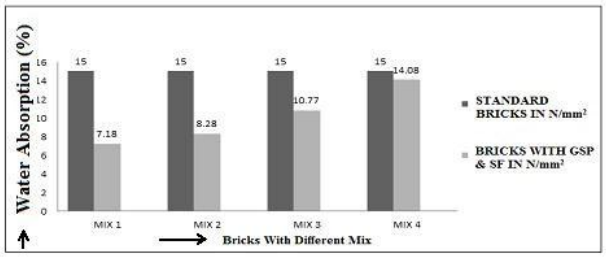
By mistreatment the assorted collected literatures, the compressive strength of ordinary bricks was obtained and compared. The knowledge obtained from the experimental study was shown below

Compressive Strength of Standard Bricks Vs Bricks with WSP & SF

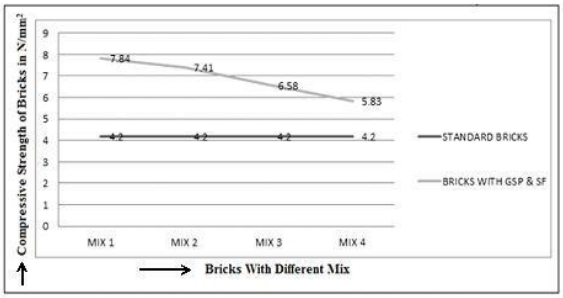


Water Absorption Limit of Standard Bricks Vs Bricks with Wood Sawing Powder Waste & Silica Fume.

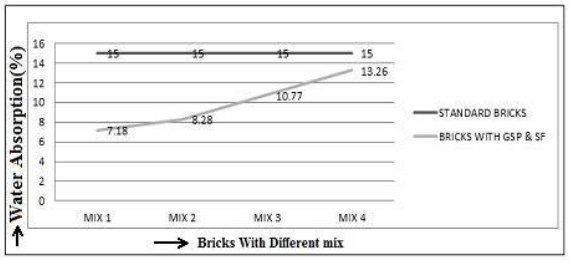
From the theoretical studies, it absolutely was ascertained that the water absorption limit for the quality bricks wasn't quite 15% by weight. The water absorption limit for the bricks exploitation Wood sawing powder waste & oxide fume was obtained as seven.18 to 13.26% by weight taken once twenty four hours.



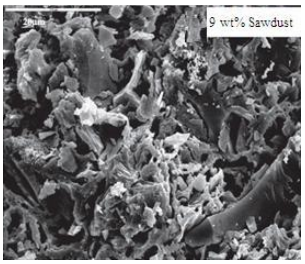
Compressive Strength Variations Graph



Water Absorption Test Value Variations Graph



SEM micrograph of bricks with 9 wt% of Eucalyptus sawdust



SUMMARY

In our project study, we have a tendency to created applied math analysis between normal bricks and bricks With Wood Sawing Powder & silicon dioxide fume. there's major distinction between normal bricks & bricks With Wood Sawing Powder & silicon dioxide fume like compressive strength worth, water absorption and quantity of salts presents in bricks etc.

5. CONCLUSIONS

Based on the scope of the investigation, the following conclusions can be drawn:

- Clay was found to be part replaced by Wood sawing powder with silicon dioxide fume as into five hundredth.
- From the compressive strength check, it absolutely was determined that the brick victimization Wood sawing powder waste and silicon dioxide fume as clay offers additional compressive strength as scrutiny the quality brick, i.e., 5.83 to 7.84 N/mm2
- From the water absorption take a look at, it had been found that the brick victimization Wood sawing powder waste and silicon dioxide fume as clay offers less share of absorption as scrutiny the quality brick, i.e., 7.18 to 13.26 you curious about weight.
- From the results of technological tests, it's instructed that Wood sawing powder waste and silicon dioxide fume will be incorporated up to fifty wt. was clay materials for the assembly of bricks.
- The incorporation of Wood wastes has negligible result on the mechanical properties throughout the complete method, anticipating no pricey modifications within the industrial assembly line.
- Less share of silicon dioxide fumes solely needed for increasing the strength of the bricks.
- This quite bricks with Wood sawing powder waste and silicon dioxide fume will wide accustomed build the structures like walls, parapet walls and etc.

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