"FLY ASH BRICKS WITH ADDITIVE AS A SILICA"

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Abstract : Building materials are the most important constituents in construction. One of the principal components are bricks. From ancient times clay bricks are used in different components of the structure such as load bearing walls, foundation, multi-storey and parapet etc. Moreover, to meet the demands of the increasing population, leads to exhaustion of natural resources. To compensate this many waste materials are being used in various construction materials up to some extent which posses' similar properties as those of natural materials. Materials such as fly ash, rice husk ash and GGBS etc. used in bricks, soil stabilization and in cement up to small percentage. Fly ash being used in bricks and many studies shows the positive impact on various parameters like compressive strength, water absorption and dry density. Fly ash as a main constituent is used instead of clay along with sand, Hydrated lime, POP and Silica as an additive in different proportions. The brick specimens of 230mm*107mm*77mm were manufactured and different properties like compressive strength, dimension test, water absorption and effloresce were tested at 28 days of curing. The economical mix for maximum compressive strength and cost analysis was done. It was observed that compressive strength increases with decrease in fly ash quantity, water absorption value increases with increase in fly ash. Further, with silica as an additive strength increases as we increase the silica content in small ratio. No effloresce effect was seen in any of the manufactured sample.

I. INTRODUCTION

Every moment to satisfy the human needs respectable quantity of crude fuel and raw coal are burning. Carbon dioxide emission into the atmosphere is increasing day by day. Which is causing global warming and this weakens the heat–trapping blanket that surrounds the planet. Due to faster growing industry of thermal power plants huge quantity of Fly Ash is getting obtained. The disposal strategies of Fly Ash are creating environmental degradation. On the opposite side, CO_2 is getting released to the atmosphere due to the production of tons of cement. Reduction in the usage of cement can be done by victimisation other possible alternatives having cementing properties without compromising. This resource is very valuable and being used for different projects like production of Fly Ash Cement Bricks as substitute to Burnt clay bricks. A vast number of bricks are required for construction like new houses, elevated structures for expanding populace at a high rate. The urbanization prompts the utilization of regular bricks at a high rate (Akhtar et al. 2011). al. 2015). Fly ash is a finely divided residue resulting from the combustion of powdered coal, transported by flue gases and collected by electrostatic precipitators (Gawatre and Vairagade 2014). It contains a small amount of unburnt carbon, which is acidic in nature. Its main constituents are silica, aluminium oxide, and ferrous oxide. With the increase in the limit of warm power age in India the production of fly powder is all time high, which is roughly 50 million tons for every year. There are more than 70 warm power plants are in production and in future this number may increase to satisfy the requests of expanding populace (Banu et al. 2013).

II. MIX DESIGN

The study is done in three categories. In each category the proportion of Fly Ash was changed by weight i.e. 60% in first category, 70% in second category and 80% in third category. Simultaneously in each category the proportion of sand was changed by weight i.e. 30% in first category, 20% in second category and 10% in third category. In each category cement was replaced by Silica Fume at 0%, 1%, 2%, 3%, 4%, and 5% respectively.

Table 1. % of constituents for Category – I

(All constituent are measured by weight)

MIX	FLY ASH (%)	SAND (%)	CEMENT (%)	SILICA FUME (%)
1.	60	30	10	0
2.	60	30	9	1
3.	60	30	8	2
4.	60	30	7	3
5.	60	30	6	4
6.	60	30	5	5

Table 2. % of constituents for Category y – II

(All constituent are measured by weight)

MIX	FLY ASH (%)	SAND (%)	CEMENT (%)	SILICA FUME (%)
7.	70	20	10	0
8.	70	20	9	1
9.	70	20	8	2
10.	70	20	7	3
11.	70	20	6	4
12.	70	20	5	5

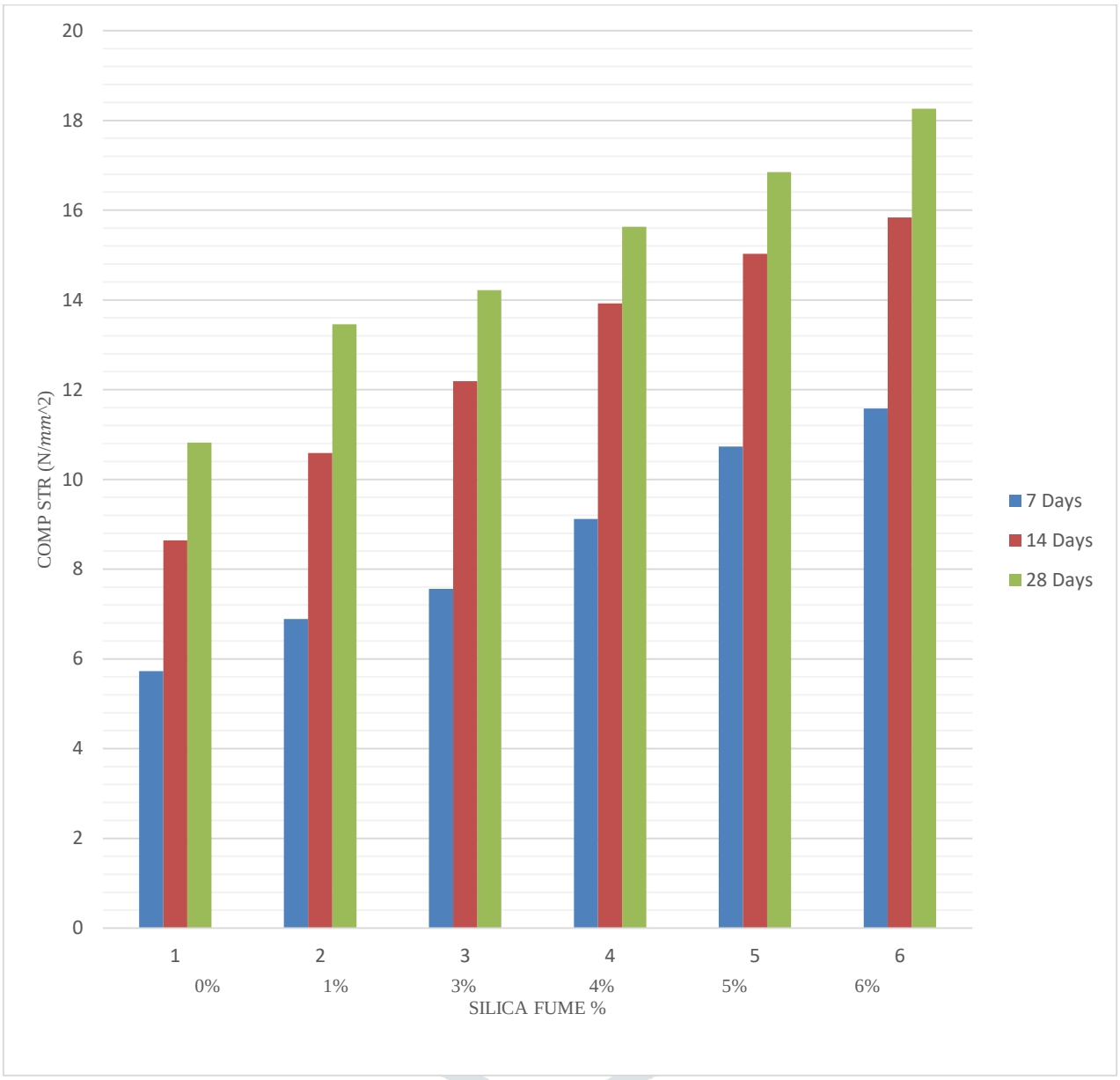
Table 3: % of constituents for Category – III

(All constituent are measured by weight)

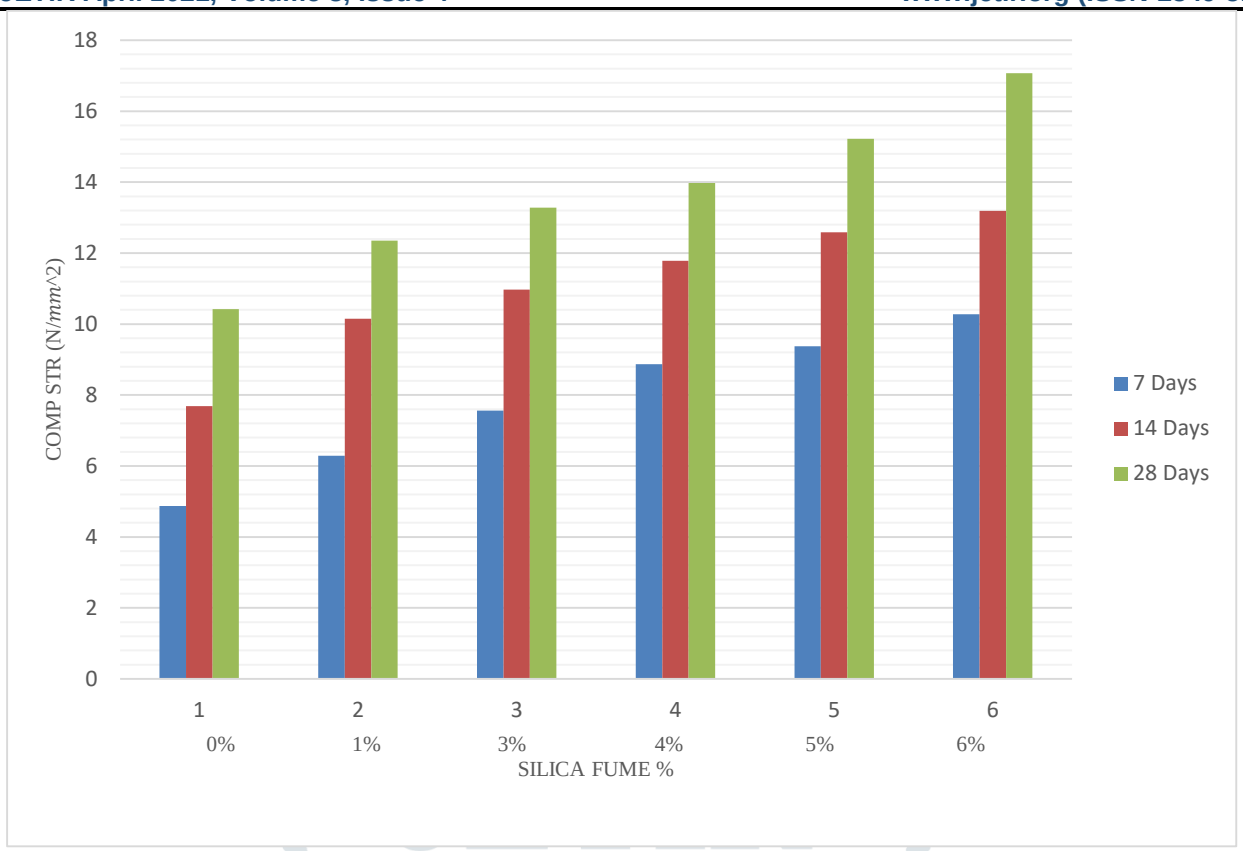
MIX	FLY ASH (%)	SAND (%)	CEMENT (%)	SILICA FUME (%)
13.	80	10	10	0
14.	80	10	9	1
15.	80	10	8	2
16.	80	10	7	3
17.	80	10	6	4
18.	80	10	5	5

III. RESULTS AND DISCUSSION

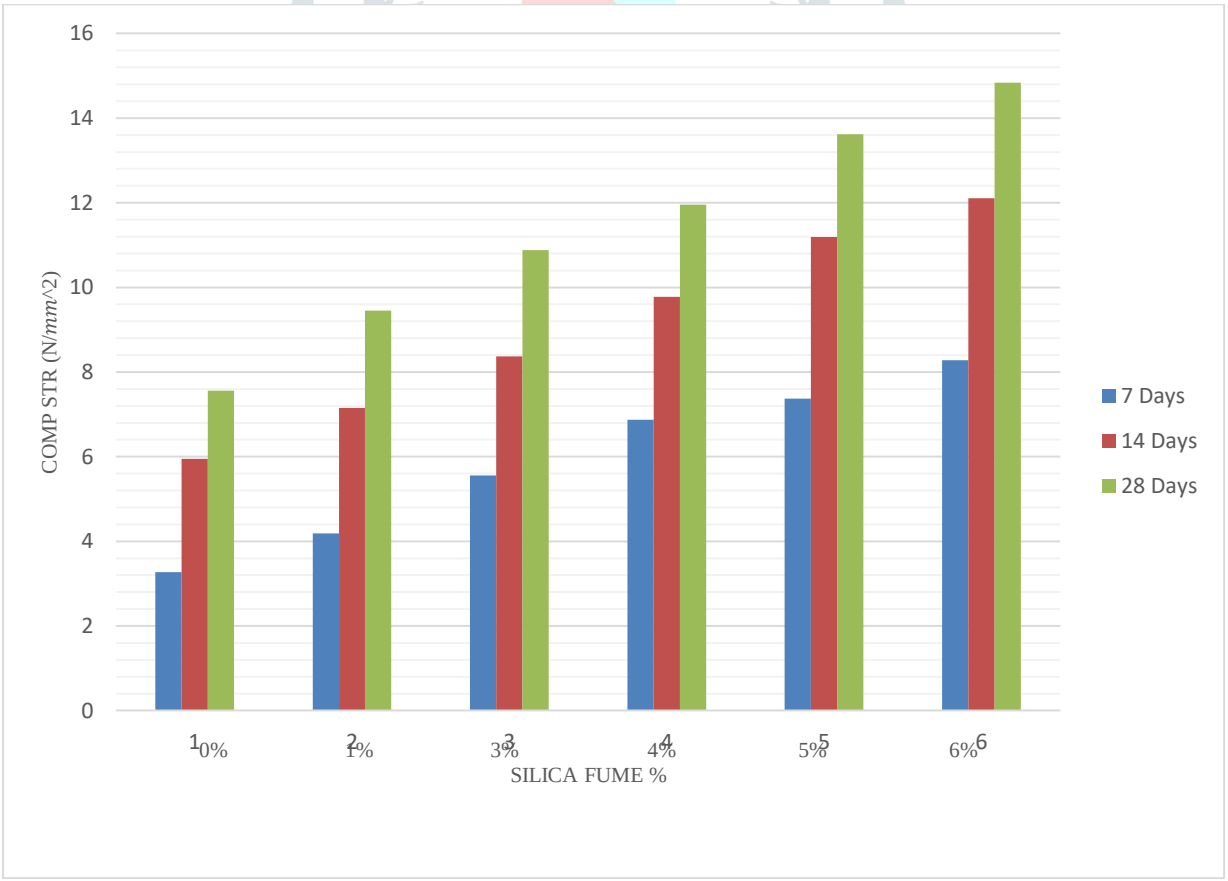
Compressive strength of category I i.e. 60% usage of Fly Ash in Fly Ash Cement Bricks are showed in figure 1.



Compressive strength of category II i.e. 70% usage of Fly Ash in Fly Ash Cement Bricks are showed in figure 2.

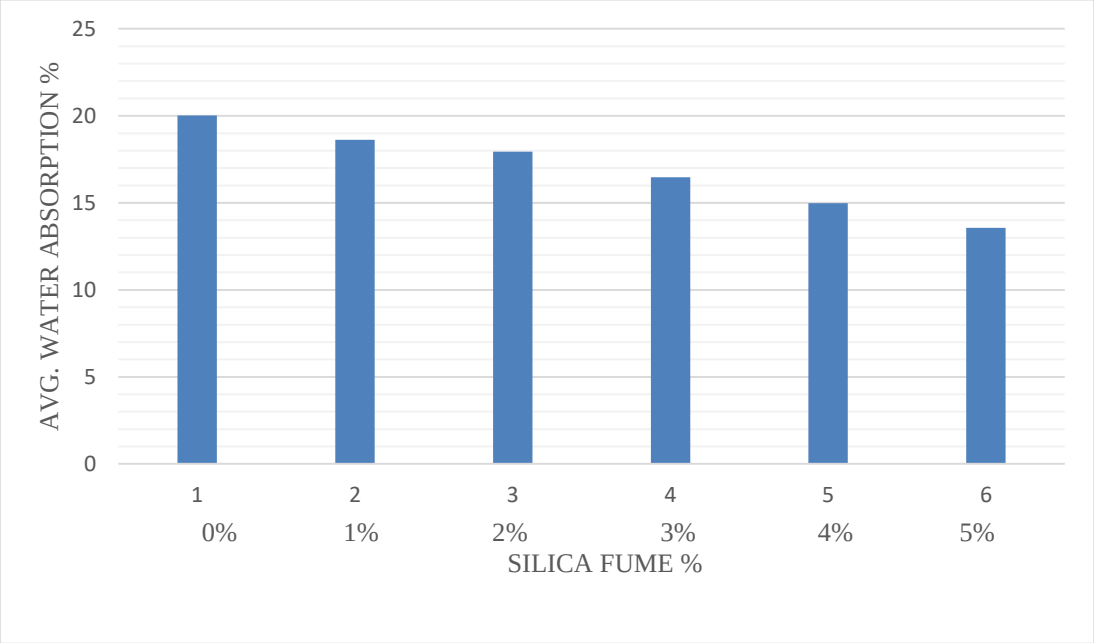


Compressive strength of category III i.e. 80% usage of Fly Ash in Fly Ash Cement Bricks are showed in figure3.

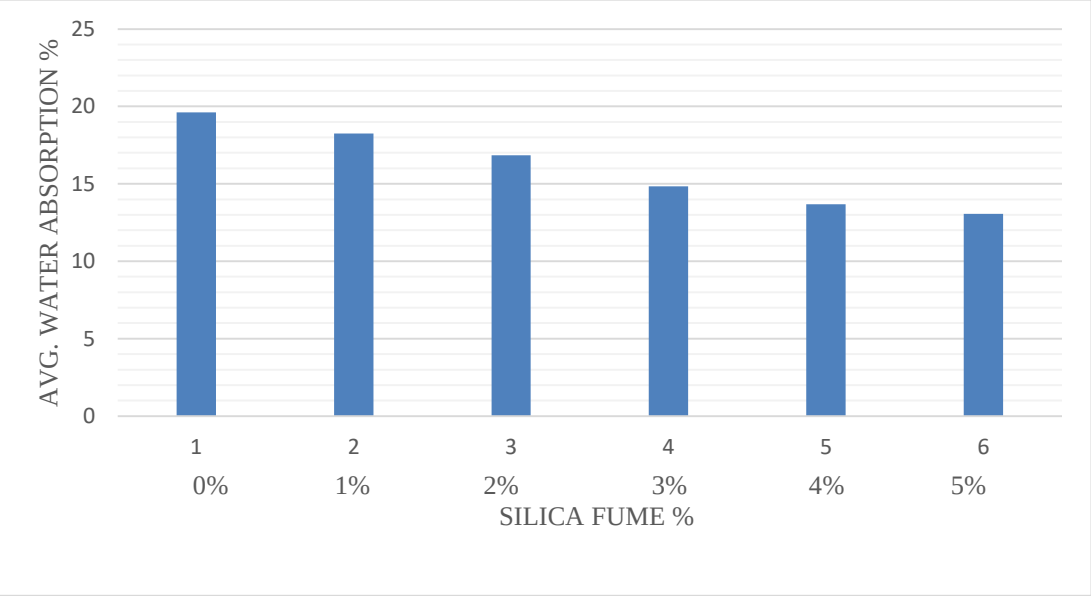


It is observed that with increase in Silica Fume percentage in the mix the compressive strength of the bricks is also increasing. One another considerable point in this investigation is observed that with increase in Fly Ash content in Bricks the compressive strength of bricks is decreasing.

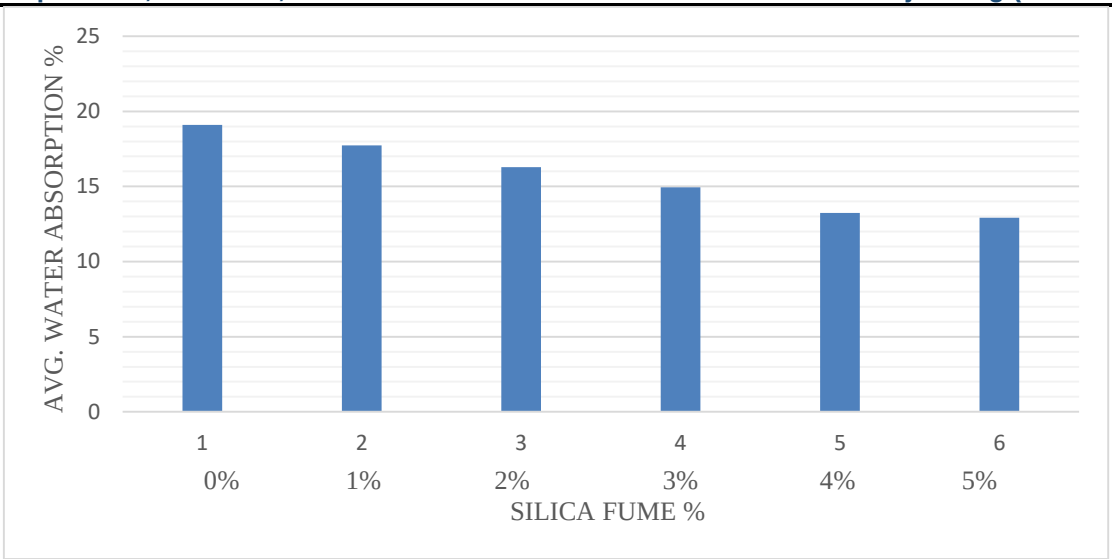
Water Absorption of category I i.e. 60% usage of Fly Ash is showed in Figure 4.



Water Absorption of category II i.e. 70% usage of Fly Ash in Fly Ash Cement Bricks are showed in figure 5.



Water Absorption of category III i.e. 80% usage of Fly Ash in Fly Ash Cement Bricks are showed in figure 6.



The pattern was observed, which stated the decrease in the percentage of water absorption with the increase of both Silica fume and Fly Ash. The dry density of the bricks were observed for different mix for category – I, II & III. Result shows that decrease in pattern is observed with increase of silica fume a decrease pattern also observed with the increase of fly Ash in the bricks.

IV. REFERENCES

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