Evolution of Properties of Fly Ash Bricks with Glass Powder

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Abstract— Fly ash is produced in expansive measures, particularly by warm power plants. An incredible bunch of request has been directed out for proficient usage of fly ash in the structure business. Utilization of fly ash in assembling block is one such thing which is being contemplated by numerous examination researchers and specialists. In this article various properties of fly ash bricks are investigated and studied, like water absorption and compressive strength. Lime- Fly ash bricks are casted with pressed technique and with 40-60 lime – fly ash ratio and in this proportion glass powder is added by total weight, upto 30% at an interval of 10%.

Key words: Lime, Fly Ash, Glass Powder, Compressive Strength, Water Absorption

I. Introduction

Pounded fuel ash generally known as fly ash is a helpful by-item from warm power stations utilizing pummeled coal as fuel and has impressive pozzolonic movement. This national asset has been productively utilized for the assembling of pummeled fuel ash-lime bricks as a supplement to regular smoldered earth building's bricks prompting protection of common assets and change in ecological quality.

II. Manufacturing of Fly Ash Bricks

The modular brick samples of size 190 mm × 90 mm × 90 mm (IS: 12894-2002) were cast in the laboratory using lime and Fly Ash. Similarly, pressed modular bricks made of Lime and Fly Ash in the proportion were cast, finally in these mixes 10%, 20% and 30% Glass powder is added to the proportions (by weight). The pressure molded bricks were prepared by applying of 50 kN. The molded brick was set aside to dry for two days, protecting from direct sun. The specimens were immersed in water at room temperature for 24 hours and thereafter, the specimens were held out of water. These samples were cured by moist jute bags for 7, 14 and 28 days. The samples were tested after 7 and 28 days of curing, for compressive strength as per the provisions of IS: 3495 (Part 1) -1992. The water concentration of the bricks was tested as per the provisions incorporated in IS: 3495 (Part 2) -1992. Before testing, the frogs and voids of the specimen were filled up with cement, sand mortar (1: 1). Mix proportion of the bricks are given in table 1, on bricks water absorption and compressive strength test is performed.

S. No.	Glass Powder Content	Lime – Fly Ash	Mix Name
1	**0%**	40-60	A1
2	**10%**	40-60	A2
3	**20%**	40-60	A3
4	**30%**	40-60	A4

Table 1: Mix Proportion of Bricks

III. Raw Material

A. Fly Ash

Fly ash is a by-product of thermal power plant and for this project fly ash is collected from dirk india limited. Specific gravity of the fly ash is 2.58 and fineness modulus is 5.14.

B. Lime

Locally available lime is collected which satisfies IS 712 – 1973. Specific gravity of lime 2.25 and fineness modulus is 7.24.

C. Glass Powder

Waste material which is obtained from glass industries in the powder form is called glass powder. Specific gravity of glass powder is 2.32 and fineness modulus is 5.21.

D. Water

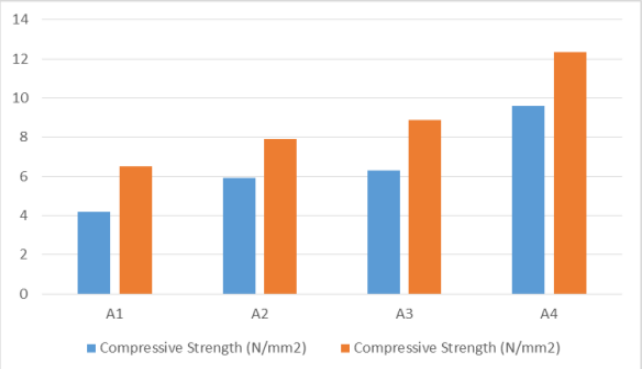
In this project clean water is used which is collected from municipal water Supply.

IV. Result and Discussion

When glass powder is introduced in fly ash brick it has been observed that glass powder increases compressive strength of the bricks, result of compressive strength of fly ash bricks is given in table 2 and graph 1-2. Glass powder also decrease water absorption of fly ash bricks, result of water absorption of fly ash brick is given in table 3 and graph 3-4.

S. No.	Glass Powder Content	Lime-Fly Ash	Mix Name	Compressive Strength (N/mm^2)	
				7 Days	28 Days
1	**0%**	40-60	A1	4.2	6.52
2	**10%**	40-60	A2	5.9	7.9
3	**20%**	40-60	A3	6.3	8.9
4	**30%**	40-60	A4	9.6	12.35

Table 2: Compressive Strength Results of Fly Ash Bricks



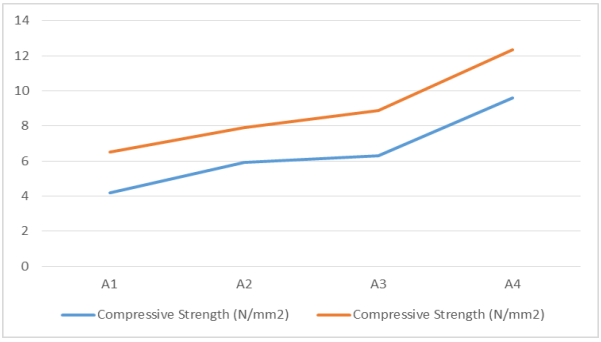


Fig. (1) & (2): Compressive Strength Results of Fly Ash bricks

S. No.	Glass Powder Content	Lime-Fly Ash	Mix Name	Water Absorption
1	**0%**	40-60	A1	17.20%
2	**10%**	40-60	A2	15.30%
3	**20%**	40-60	A3	13.30%
4	**30%**	40-60	A4	11.40%

Table 3: Water Absorption Result of Fly Ash Bricks

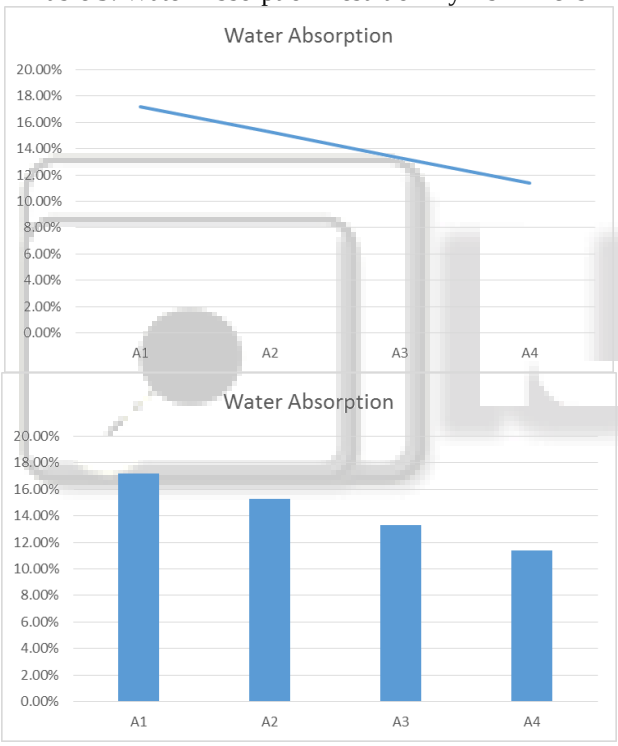


Fig. (3) & (4): Water Absorption Result of Fly Ash Bricks

V. CONCLUSION

From the present study we concluded that Glass powder increases the Compressive strength of fly ash bricks and also Water Absorption of fly ash bricks is decreased. As per IS 12894 : 2002, 0% glass powder bricks comes under class 5, fly ash bricks with 10% - 20% glass powder bricks comes under class 7.5 and 30% fly ash bricks comes under class10, because as IS 12894 minimum average compressive strength of a fly ash-lime bricks when it is tested for compressive strength it will not be less than the one specified for each class and also its water absorption must be lesser than 20%

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