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CHARACTERISTICS STRENGTH OF FIBRE IN FLY ASH BRICK

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Abstract - *In our project to study the characteristics strength of the fibre in fly ash brick. Hence we added the polypropylene fibre. The raw materials are cement, fly ash, gypsum, fibre, lime. Fly ash is used by 65%, M sand used 25%, Gypsum is 2% used ,Fibre is 0.1% used, 53 grade of Ordinary Portland Cement content where used 8%, 7.5%, 5%, 2.5%, 0%, and lime used different percentage 0%, 0.5%, 3%, 5.5%, 8% respective percentage can used. The cement test by specific gravity, finess test consistency test, setting time test. The fly ash brick tested by compression test, water absorption test, efflorescence test, structure test, soundness test, and size, shape and color test. The experiment in our studies encourage future research in the direction for long term performance for the use of structural application. In a now-a-days there has been a significant increase in the use of fibre in brick improving tensile strength and ductility. This paper present in details for experimental study done by using polypropylene fibre with fly ash and conclusion from various strength parameters.*

Key Words: Fly ash brick, Lime, Gypsum, M-Sand, Polypropylene fibre.

1. INTRODUCTION:

Fly ash is waste material and to product a by-product from thermal power generation. It is creating severe environmental pollution. So much research is being conducted from more than two decades for it is proper utilization in cement and brick production as well as to control environmental in the surroundings areas of power plant. Using fly ash to make bricks instead of cement and clay reduces greenhouse gas and slow down global warming, because large amount of carbon dioxide is produced for manufacture cement and for clay bricks production much energy burned by fossil fuel. The fly ash particles are spherical and have some fineness as cement so that the silica is readily available for reaction. Fly ash is generally grey in color, abrasive, mostly alkaline and refractory in nature. The pozzalonic properties and lime binding capacity of fly ash makes it useful for the production of bricks, cement and concrete. Fly ash bricks are more strength and an economical alternative to conventional burnt clay bricks. Due to its high availability and excellent properties presently in Indian sceneries fly ash is utilized in different sectors such as cement manufacture, substitution, road and embankment, low lying area filling, brick manufacturing. It exhibits excellent physical, chemical and mechanical properties including low density, micro porosity, high surface hardness, negligible shrinkage, high strength, thermal stability, fire and chemical resistance than conventional clay bricks. Poly vinyl acetate is a aliphatic rubbery synthetic polymer. It's commonly manufactured using a reaction in liquid phase or in solid phase. It is commonly referred to as wood glue, white glue, carpenter's glue. They are used in cement, textile and lumbering processing and automobiles. The main applications were in making glue, book binding and construction materials. In this investigation bricks of fly ash, sand, lime, gypsum with various percentage additives of polyvinyl acetate are prepared and to determine the compressive strength of the fly ash bricks.

1.1 OBJECTIVE

- To increase the compressive strength of fly ash bricks.
- To reduce the pores in the fly ash bricks by using poly vinyl acetate.
- To improve the mechanical properties of fly ash bricks by adding poly vinyl acetate as binder.

1.2 METHODOLOGY

- Literature Collection And Study
- Material Collection And Study
- Test On Material Study & Properties
- Mix proportion of fly ash brick
- Casting Of Specimens
- Curing Of Specimens
- Testing The specimens
- Result And Discussions
- Conclusion

2. MATERIAL PROPERTIES

a) Cement (OPC 53)

b) Fly ash

c) Lime

d) Gypsum

e) M-Sand

f) Polypropylene fibre

Cement

Cement OPC53 Grade conforming IS12269:1987, Minimum cement content: 320 kg/m3 (IS456:2000)

Table -1

S .No	Test for cement	Apparatus	Value obtained
1.	Standard consistence test	Vicat apparatus	26.5%
2.	Initial setting time test	Vicat apparatus	30min
3.	Final setting test	Vicat apparatus	230mim
4.	Specific gravity test	Conical flask	3
5.	Sieve analysis test	Sieve setup	4%

Fly ash

Table - 2

S.No	Test For Fly Ash	Apparatus	Value Obtained
1	Water absorption	Pan, water	1.2%
2	Specific gravity test	Conical flask	2.5

Lime

Lime is an important binding material in building construction. It is basically Calcium oxide (CaO) in natural association with magnesium oxide (MgO).

Gypsum

Gypsum is non-hydraulic binder occurring naturally as a soft crystalline rock or sand. It has a specific gravity of 2.31 grams per cubic centimeter. The density of gypsum powder is 2.8 to 3 grams per cm^3.

M-Sand

Table - 3

S.NO	Test for M sand	Apparatus	Value obtained
1	Fineness modulus	Sieve	2.4
2	Specific gravity	Pycnometer	2.7
3	Water absorption	Pan, water	1.6%

Polypropylene fibre

Table - 4

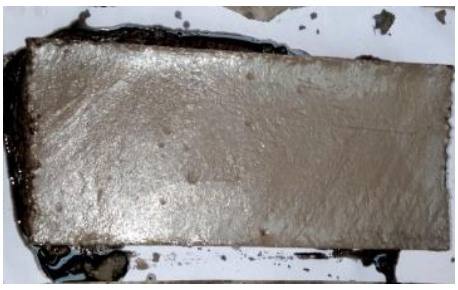
S.No	Physical properties	Value obtained	Test sample value
1.	Particle size	Grained	Grained
2.	Appearance	White and shiny	White and shiny
3.	Type	Air cooled	Air cooled
4.	Specific gravity	2 – 3	2.26

3. MIX PROPORTION

Mix proportion of fly ash brick

SPECIMEN NO.	FLY ASH	MSAND	CEMENT	LIME	GYPSUM
SP-I.	65 %	25%	5%	0%	2%
SP-II.	65 %	25%	7.5%	0.5%	2%
SP-III.	65 %	25%	5%	3%	2%
SP-IV.	65 %	25%	2.5%	5.5%	2%
SP-V.	65 %	25%	0%	8%	2%

4. CASTING OF SPECIMENS



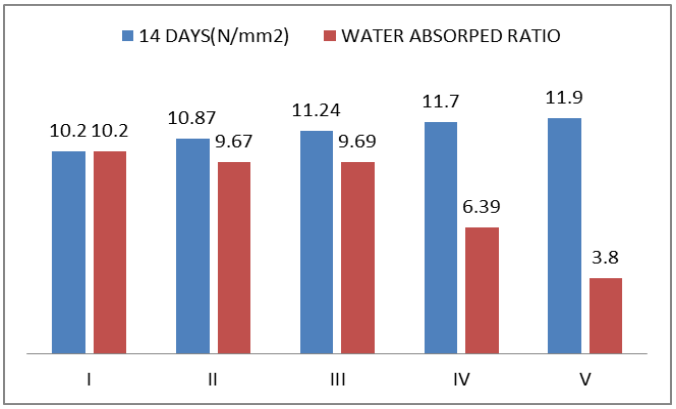
5. TESTING OF SPECIMENS

a) Water absorption test
b) Compressive strength test

PROPORTION	WATER ABSORPED RATIO
I	10.20
II	9.67
III	9.69
IV	6.39
V	3.8

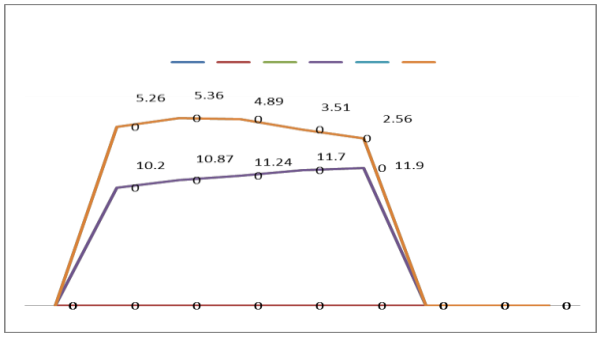
PROPORTION	14 DAYS(N/mm²)
I	10.20
II	10.87
III	11.24
IV	11.70
V	11.90

Comparison between compressive strength and water absorption test:

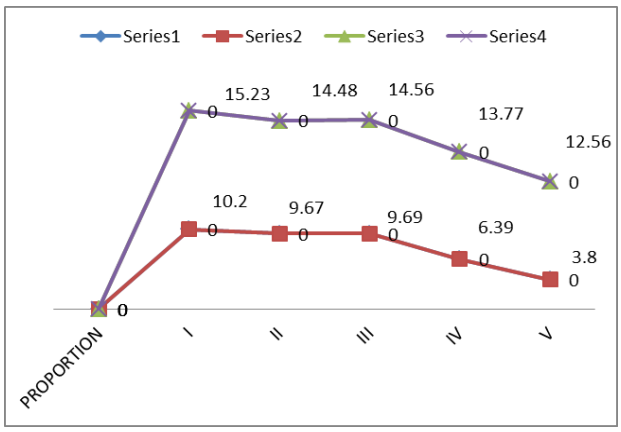


Error! Not a valid link. 6. Compression between conventional fly ash brick and fibre fly ash brick:

a) Compression test



b) water absorption test



7. CONCLUSION

Based on the experimental study, following conclusion can be drawn regarding the strength behavior of fly ash bricks. From the above investigation, the study was conducted to find the optimum mix percentage of fly ash bricks. It is found that compressive strength of the fly ash brick increasing with addition of fibre content, because it produces an increase in the strength of the bonds. Hazardous effect and disposal problems of waste materials can be reduced thoroughly this study. It is expected that these guidelines will serve the purpose of manufacturing good quality fly ash bricks.

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