JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

MODIFICATION OF AAC BLOCK WITH PLASTIC FIBER's

[1]Mohd Ahmar Khan, [2]Mohit Kumar, [3]Richa Singh, [4]Hina Bhagel, [5]Noorul Bashar

[1] UG Student,[2] UG Student,[3]UG Student, [4]UG Student, [5]Asisstant Professor

[1]Civil Engineering Department,

[1]Vivekananda College of Technology and Management(A.K.T.U. Lucknow), Aligarh, India

Abstract: The plastic waste is the hazardous problem in today's world. This is most dangerous problem in front of humanity. The most hazardous type of wastes are HDPE and PTE and the plastic below 50 micron is also causing a serious problem. These plastic mixed in the soil, it directly effects on fertility of the soil. Nowadays, the large amount of plastic is deposited into sea. This plastic wastes gives hazardous effect on the aquatic life and quality of seawater also polluted by this plastic. So, in this paper we have find a solution of this problem. As we are aware that AAC block is becoming a largest and growing construction material we are adding plastic bottle (PET bottle) along with AAC block. AAC block is generally made up of fly ash, quick lime, cement and gypsum along with aluminium powder mixes with plastic bottles that we are introducing in it. Plastic bottles can be collected in nearby all area.

***Index Terms*- Modified AAC Block, Plastic Bottle, Compressive Strength Test, Water Absorption Test, Dry Density, Wet Density.**

I. INTRODUCTION

Plastic is very hazardous material and non-biodegradable substance which is very difficult to decompose it is the main problem in the world and it causes pollution to land as well as water to the environment. Use of plastic is high and it is estimated that the rate of usage of plastic is doubled for every 10 years. The usage of plastic is large in consumption and one of the major plastic wastes is polyethylene (PE).

In modern architecture, especially in dwelling buildings, one of the most popular and frequently used materials for construction of frame building are Autoclaved Aerated Concrete (AAC) blocks with thin layer joints. AAC block is porous, non-toxic, reusable, renewal and recycle. AAC block is one of the eco-friendly product. AAC block may be one of the solution and replacement for brick in frame structure.

II. SCOPE

As these are made from eco friendly material and we have added some non biodegradable material i.e., plastic fiber's to clean our environment.

III. OBJECTIVE

To present the modified AAC Block with 2% Plastic Fiber's and compares the various experimental properties between AAC Block and Modification of AAC Block with Plastic Fiber's.

IV. LITERATURE REVIEW

Anurag Wahane (2017)

He presented a procedure for manufacturing a AAC Blocks. He suggested in his paper that the proportion of fly ash: lime: cement: gypsum is 69:20:8:3 and aluminium powder should be about 0.08% of total dry weight in the mix. He also gives us the general comparison between AAC Block and Clay brick (like Breakage wastage, Cost, Availability etc).

V. MANUFACTURING

1) Raw Materials Used in the Manufacture of AAC Blocks

- ***Fly Ash:*** *It is usually a by-product of thermal power plants and is an important raw material in the manufacture of AAC Blocks.*
- ***Cement****: Portland cement is generally preferred over other types of cements.*
- ***Water****: Potable water should be used which must conform to the general requirements of the concrete.*
- ***Quick Lime****: Lime powder required for AAC production is obtained either by crushing limestone to fine powder at AAC factory or by directly purchasing it in powder form from a vendor.*
- ***Gypsum****: Gypsum is easily available in the market and is used in powder form. It is stored in silos.*

- ***Aluminium Powder***
- ***Plastic****: Plastic bottles (PET bottles) should be preferred.*

2) Procedure

- ***Dosing, Mixing, Pouring and Pre-Curing****: Lime and cement are dumped into the pouring mixer and fly ash slurry is fed by a control system to the mix. Aluminium powder and cut plastic bottles are measured and put into pouring mixer directly. The adequate temperature of the slurry should be reached before pouring. After pouring the mould with slurry is kept in a pre-curing room atleast for 2-3 hours. During this time the aluminium powder will react to release hydrogen, which expands the volume of the slurry and makes it solid cake like.*
- ***Curing****: The blocks are cured properly through steam curing which helps the AAC Blocks to attain desired strength. The blocks are stored at a proper place for usage after curing.*

VI. DETAILS OF BLOCKS

- ***Standard AAC Block****- Dimensions: 620 x 196 x 98 mm*
- ***Modified of AAC block with plastic Fiber's****- Dimensions: 150 x 150 x 150 mm and 72 x 72 x 72 mm*

VII. TEST PERFORM

The following tests were performed on the standard AAC block samples and modified AAC block (2% plastic fiber's). 12 sample AAC Blocks were taken out of which 6 were tested for dry density, wet density and water absorption and 6 blocks were tested for compressive strength.

The following tests were performed on the samples

1) Dry Density
2) Wet Density
3) Water Absorption test
4) Compressive Strength test

VIII. OBSERVATION

Table 1: Dry Density

S. No.	Dry Density (Kg/m^3)	
	Standard AAC block	Modified AAC block (2% plastic fiber's)
1	640.00	1132.43
2	700.49	1100.00
3	687.73	1213.51
4	621.58	1023.33
5	672.37	1267.06
6	680.53	1348.07
Average	**667.17**	**1180.73**

Table 2: Wet Density

S. No.	Wet Density (Kg/m^3)	
	Standard AAC block	Modified AAC block (2% plastic fiber's)
1	995.50	1540.54
2	1023.41	1502.70
3	1012.27	1635.14
4	932.36	1393.33
5	976.84	1723.15
6	1010.53	1779.22
Average	**991.82**	**1595.68**

Table 3: Water Absorption Test

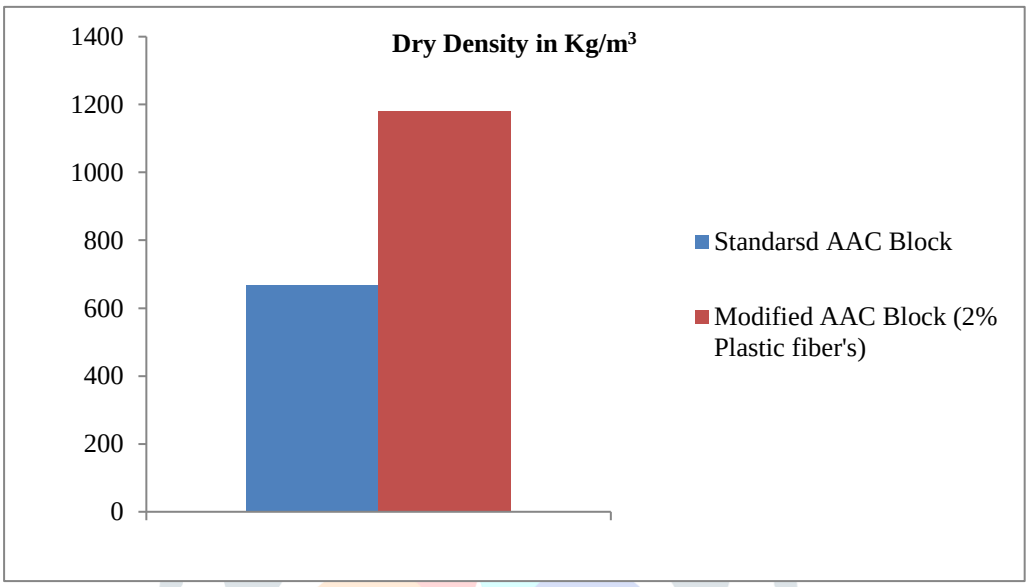
S. No.	Water Absorption (%)	
	Standard AAC block	Modified AAC block (2% plastic fiber's)
1	55.55	36.04
2	46.10	36.61
3	47.19	34.74
4	50.00	36.16
5	45.28	35.99
6	48.49	31.98
Average	**50.27**	**35.25**

Table 4: Compressive Strength Test

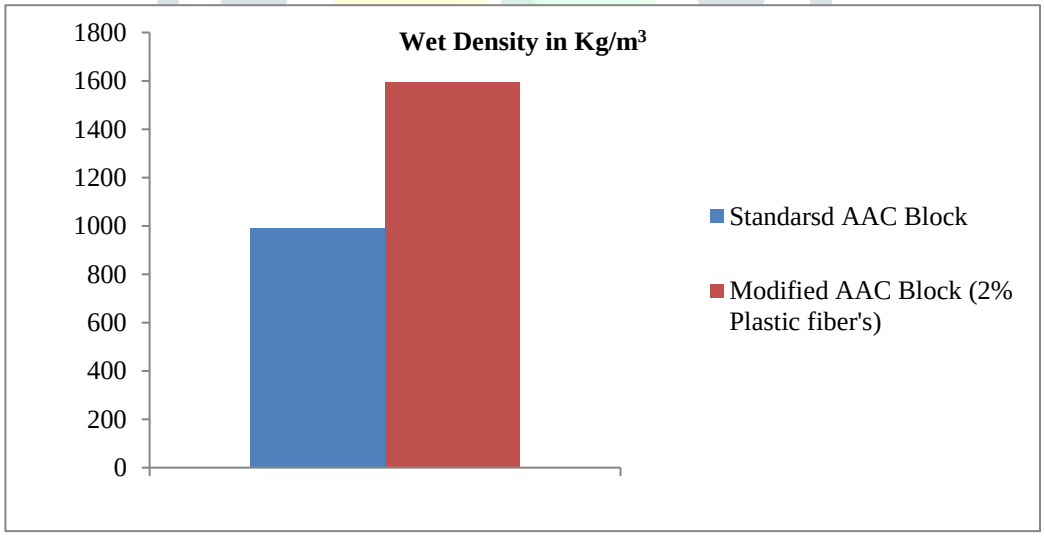
S. No.	Compressive Strength(N/mm^2)	
	Standard AAC block	**Modified AAC block (2% plastic fiber's)**
1	4.16	1.93
2	4.11	1.93
3	4.23	2.22
4	4.34	1.78
5	4.12	1.78
6	4.34	1.78
Average	**4.22**	**1.90**

IX. RESULT AND DISCUSSION

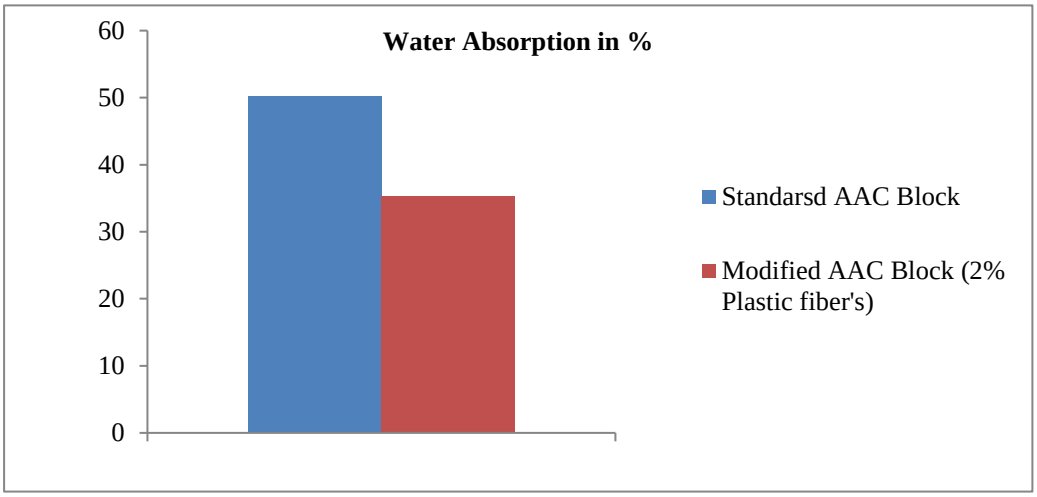
1) ***Dry Density:*** The average dry density of standard AAC Block is 667.17 kg/m^3 whereas Modification of AAC Block with plastic (2% plastic fiber's) is 1180.73 kg/m^3.



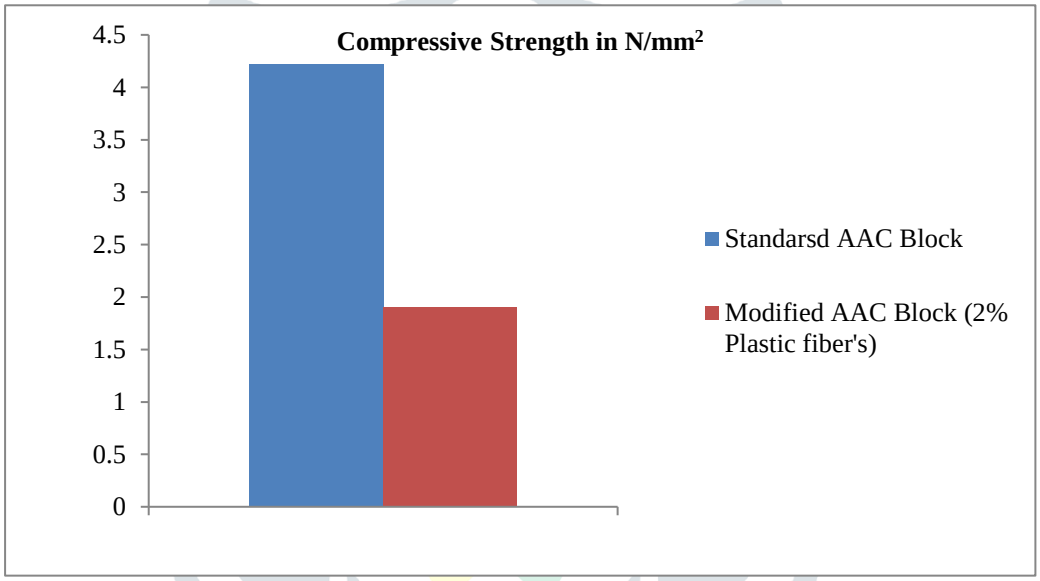
2) ***Wet Density*:** The average wet density of standard AAC Block is 991.82 kg/m^3 whereas Modification of AAC Block with plastic (2% plastic fiber's) is 1595.68 kg/m^3.



3) ***Water Absorption*:** The average water absorption of standard AAC Block is 50.27 % whereas Modification of AAC Block with plastic (2% Plastic Fiber's) is 35.25 %.



4) ***Compressive Strength:*** The average compressive strength of standard AAC Block is 4.22 N/mm^2 whereas Modification of AAC Block with plastic (2% plastic fiber's) is 1.90 N/mm^2.



X. Conclusion

1) A plastic (PET) bottles, which is available everywhere, may be put to an effective use in AAC block making.
2) Modified AAC Block with Plastic fiber's can help reduce the environmental pollution, thereby making the environment clean and healthy.
3) As we can see from our experimental result that Dry Density and Wet Density is higher in case of Modified AAC Block as we compare it with Standard AAC block. So we can use Modified AAC Block under water as we cannot use the Standard AAC Block.
4) As our experimental result shows that the Water Absorption is lower in Modified AAC Block in comparison to Standard AAC Block. So it could be use in places where, there is lots of rainfall.
5) As our result shows that the Compressive Strength is lower in Modified AAC Block as we compare it with Standard AAC Block. So we cannot use it in load bearing structure but we could use it in frame structure as wall and we are trying to increase Compressive Strength in future using some admixture and other materials.

XI. References

1) Anurag Wahane. "Manufacturing Process of AAC Block" International Journal of Scientific Engineering and Research (IJSER) Vol. 6 Special Issue No. (2), September 2017
2) Jagadish Vengala, Shivakumar Mangloor, Talla Krishna Chaitanya Goud, "Performance of Autoclaved Aerated Concrete Blocks Under Varying Temperatures". International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7, Issue-6C2, April 2019.
3) M. Suriyaa, P. Hareharan, J. Nageshwaran, S. Nandhini, R. Sathyamoorthy. "Experimental Study on Strength Behaviour of Plastic Sand Bricks" International Journal of Scientific Engineering and Research (IJSER) ISSN (Online): 2347-3878
4) D. RamaDevi, P. Vinodh Kumar, R. Vinodh Kumar." Characteristics Study Of Concrete Using Plastic Waste" International Journal of Engineering Applied Sciences and Technology, 2020 Vol. 4, Issue 12, ISSN No. 2455-2143, Pages 512-516