One Step Towards Swachh Bharath

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Abstract- *Improved sanitation has been proved to have great impacts on people's health, hygiene and economy of any country. It has shown great impacts on the environment as well. Due to various reasons there is lack of awareness among the people about hygiene in many developing countries. So we are trying to construct economical toilet by using GGBS (ground granulated blast furnace slag), as a replacement of sand up to 40%. In the project we will replace the cement by Ground Granulated Blast Furnace Slag (GGBS), as it is a waste by product of thermal power stations. Hence in this project an attempt is made to construct economical toilet.*

I. INTRODUCTION

India is the **Republic Nation**, it locates in SouthAsia. It is the 7th largest country by area, and the popular democracy in the world. It is delimited by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast.

Nearly 40% of the world's population lacks access to toilets, and the dignity and safety provide. The absence of adequate sanitation has a serious impact on health and social development, especially for children. Investments in improving sanitation will accelerate progress towards the development goals and save lives.

According to census 2011 India's urban population is 377 million. These numbers are expected to increase to 600 million by 2031. It also shows that in 4500 towns close to 8 million households do not have access to toilets and defecate in the open. This leads to weak sanitation and significant health costs and untreated sewage from cities is the main reason for the water resource pollution in India. To overcome these problems, we are trying to construct economical toilet for the people who are financially challenged and poor awareness in hygiene. Toilet is a part of human hygiene which is critical concern in the history of human civilization.

About India's hygiene

"According to an article called Live Mint, data has been released by the "National Sample Survey Office"(NSSO)fromasurveyconductedin2012; in which it has once again considered as the terrible state of hygiene in the country ,mainly inrural India.From this survey, merely 32% of rural households have their own toilets".

Poor sanitation and unhygienic condition of city

II. OBJECTIVES

- To prepare economical toilet, by replacing cement by GGBS (Ground granulated blast furnaces lag).
- To improve hygienic condition of the rural area.
- To create awareness among the people of rural area about the importance of the toilet and its usage.
- To improve the sanitation condition of the rural area.

III. METHODOLOGY

1. Welding iron frame by providing 4 columns, and room of size (1.2*1*3m) and providing wooden plank as thebase.
2. Since we are constructing economical toilet we are using chicken mesh instead of walls. Tying chicken-mesh to the frame firmly by giving lateral support.
3. Mix mortar with the replacement of cement by GGBS.
4. And with the support of plywood at the back side of the chicken-mesh apply the mortar very carefully and make the surfaces moother.
5. And continue same procedure for other walls and finish the plastering work.
6. After this curing is to be done for 28 days and surface is cleaned and painted well.
7. Fix commode to the base and provide a roof.

Primary tests conducted:

1) Consistency test on cement
2) Specific Gravity test on sand, cement and GGBS
3) Setting time of cement
4) Fineness test on cement and GGBS
5) Compression test on cement mortar cubes

6) Compression test on GGBS replaced cubes

Cement mortar blocks:

- Take moulds of size 75*75*75 mm, clean the moulds and oil the inner surface of the moulds.
- Weigh the ingredients according to the requirement.
- Clean the surface and pour the ingredients that are cement, sand and do a dry mix of ingredients.
- Pour water with the water cement ration of 1:4 and mix it thoroughly.
- Mix it till it gives uniform colour and pour that mixed mortar into mould in 3layers.
- And after each layer tamp it with the tamp ingrod by giving 25 blows and make a clean surface.

Table 1 Compression test results of cement mortar

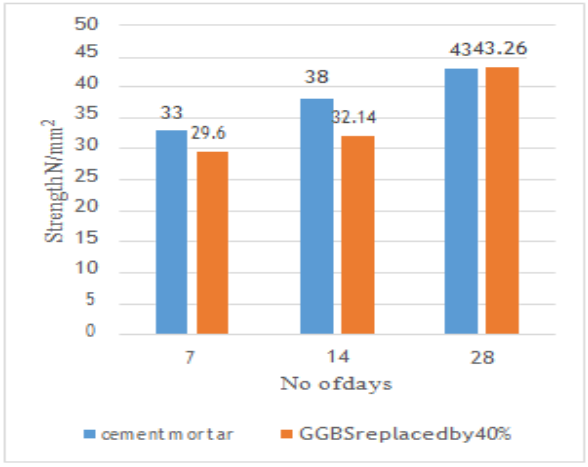
No of days	7	14	28
Strength N/mm^2	33	38	43

Mortar blocks with partial replacement of cement by GGBS:

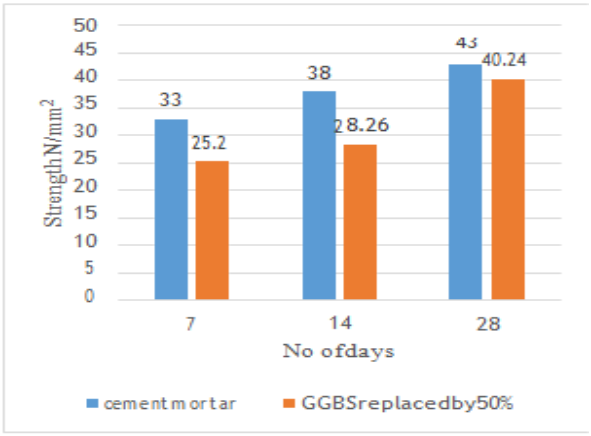
- Take materials according to the calculation by replacing the cement by 40%, 50% and 60% of GGBS (Ground granulated blast furnace).
- And same as the above steps continue the experiment.
- And unmould the blocks after 24 hours and keep it in water and do a compression test on it for 7, 14 and 28 days after curing.
- And the block which gives the maximum strengthfromthe40,50and60%ofreplacement of cement can betaken for the construction of the toilet.

Table 2 Compression test results of cement replaced by GGBS (GROUND GRANULATEDBLAST FURNACE SLAG)

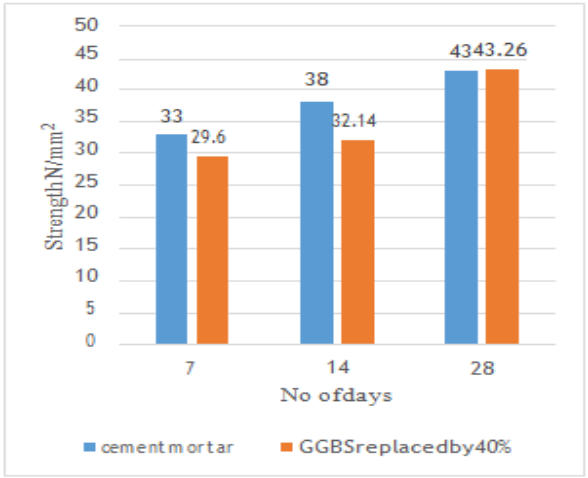
% ofGGBS	7daystrength N/mm^2	14daystrength N/mm^2	28daystrength N/mm^2
40	29.6	32.14	43.26
50	25.2	28.26	40.24
60	22.14	25.12	37.16



Graph for Comparisons between cement mortar cube strength and GGBS replaced by40%



Graph for Comparisons between cement mortar cube strength and GGBS replaced by50%



Graph for Comparisons between cement mortar cube strength and GGBS replaced by 60%

IV. CONCLUSION

- As a citizen of INDIA we should be a part of it in making clean INDIA
- By increasing the percentage of GGBS up to a certain limit we can increase the compressive strength of mortar cube.
- Can achieve the maximum compressive strengthofmortarbyreplacingcementby40% GGBS, which helps in reducing the cost of construction and gaining maximum strength.
- By replacing GGBS more that 40% helps in increasing the workability but which gradually reduces the strength of mortar paste.
- By replacing cement by GGBS and bricks or blocks by chicken mesh we can reduce the weight of the water-closet which helps in easy movement of toilet from one place to another since it is movable.

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