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

Green Concrete Mix Using Solid Waste as a Cow Dung and Bagasse Ash

Dr. L.S. Mahajan, Prof. S.P. Sharma, S. S. Borde
Hod of Civil Department, Professor of Civil Department, Student
Civil Engineering Department,
Shreeyash College of Engineering and Technology, Chh. Sambhajinagar, India
hod.civil@sycet.org, sweetyborde777@gmail.com,

Abstract— **The Process of manufacturing of ordinary Portland cement (OPC) is energy intensive and creates various environmental problems such as pollution and emmision of CO2. There is need for the alternative eco-friendly green concrete. The waste materials for agriculture, industry, bio-waste, marine waste, e-waste can be recycled and use as supplementary green concrete materials. This will reduce environmental impact of the production of OPC and reduce energy consumption.**

Keywords: OPC (Ordinary Portland Cement), Environmental Impact, Green Building

I. INTRODUCTION

Green concrete is a type of concrete that minimizes environmental impact by utilizing waste or recycled materials in place of traditional concrete components. It often incorporates industrial byproducts like fly ash, slag, and silica fume, or recycled materials like foundry sand and even plastic. This approach reduces reliance on virgin resources, lowers carbon emissions, and minimizes waste sent to landfills.

The economy of a country grows because of the infrastructure it has. Infrastructure includes things like roads, bridges, buildings, warehouses, airports, harbors, and container terminals. As the need for these facilities increases, so does the need for concrete, which in turn increases the demand for cement.

COW DUNG ASH (CDA)

Cow dung ash is obtained by drying cow dung under sun then burning it. Huge amount of ash generation are causing waste disposal problems.Cow dung ash is characterized by a high concentration of alkali compounds together with high phosphorus content typical for animal manure.

BAGASSE ASH (BA)

Bagasse Ash was burnt for approximately 72 hours in air in an uncontrolled burning process. The temperature was in the range of 700-6000°C. The ash collected was sieved through BS standard sieve size 75µm and its colour was black.

1.COW DUNG AND BAGASSE ASH POWDER PREPARATION

This is the first stage of our project. This can be subdivided into 3 main phases.

- Finalization of Process of obtaining cow dung powder and Bagasse Ash
- Physical Survey
- Preparation of powder

Process of Preparation

a. Collection of Bagasse Ash and Cow Dung Ash
b. Drying
c. Burning

d. Grinding
e. Sieving

2. DETAILS OF INGREDIENTS

2.1. Cement
2.2 Coarse Aggregate
2.3 Fine Aggregate
2.4 Cow Dung Ash

Cow dung ash is obtained by drying cow dung under sun then burning it. Huge amount of ash generation are causing waste disposal problems. Cow dung is employed as fuel for the domestic purpose, which generates solid waste as ash. Cow dung ash is characterized by a high concentration of alkali compounds together with high phosphorus content typical for animal manure.

i. Making of Cow Dung Powder

ii. Burning of Cow Dung

2.5 Bagasse Ash

Bagasse ash is a residual byproduct of burning sugarcane bagasse, a fibrous material left over after sugarcane is processed for sugar or ethanol. It's essentially the ash that remains after bagasse is incinerated in cogeneration boilers. This ash is primarily composed of silica (SiO_2) along with other compounds like alumina (Al_2O_3) and iron oxide (Fe_2O_3).

3.ADMIXTURE

3.1 Conplast 430
3.2 SBR Latex

4.CONCRETE MIX DESIGN

For this Experimental work deal with mix design of concrete as per IS code recommendation. Mix proportion of M40 grade concrete has been design as per IS 10262: 2019 and IS 456-2000.

4.1 MIXING

There are two methods adopted for the mixing of concrete.

i. Hand mixing
ii. Machine mixing

In this experimental work, the mixing of concrete was carried out by the machine mixing.

4.2 CASTING

After preparation of concrete mix the concrete, it should be poured in the mold's the specimens prepared for the various test.For the compressive Test specimen is cubical in shape shall be 15 X 15 X 15 cm.

4.2.1 CUBE MOULD

Each mould shall he provided with a metal base plate having a plane surface. The mould has dimension of 15cm X 15cm X 15 cm.

4.2.2 Tamping rod

For Cube: The tamping bar shall be a steel bar 16 mm in diameter, 0·6 m long and bullet pointeat the lower end.

4.2.3 Vibrator

Concrete vibrators consolidate freshly poured concrete so that trapped air and excess water are released and the concrete settles firmly in the place in the framework.

4.2.4 CURING OF CUBE

The test specimens are stored in moist air for 24 hours and after this period the specimens are marked and removed from the molds and kept submerged in clear fresh water until taken out prior to test.

5.Test Conducted on Fresh Concrete

5.1 Slump Cone test
5.2 Density of Concrete.
5.3 TEST CONDUCTED ON HARDENED CONCRETE
5.4 Destructive test
5.5 Compressive strength

6.CONCLUSIONS

1. Overall Strength of concrete was exceeds when 15% Cow Dung Ash & Bagasse Ash was used as Compare to conventional one.

2. Workability of concrete with different mix is decreased with 10% as compare to conventional concrete .
3. Concrete gives a maximum compressive strength, when Cow Dung Ash is used 15% & Bagasse Ash with 5% Admixtures. (Conplast 430 + SBR Latex).
4. Concrete with 15% Cow Dung Ash gives less compressive strength as compare to conventional concrete. (Conplast + any other).
5. Concrete gives a maximum strength when 15% Bagasse Ash & Cow Dung Ash is used with admixture (conplast) as compare to conventional concrete.
6. Using SCBA as a partial replacement of cement proved to be significantly effective.

7.REFERENCES

1. Ana L. Velosa and others, Hydraulic-lime based concrete: Strength development using a pozzolanic addition and different curing conditions (25 August 2008).

2. Ana L. Velosa A and Paulo B. Cachim, Hydraulic-lime Based Concrete: Strength Development.Using A Pozzolanic Addition And Different Curing Conditions (05 October 2008).

3. Hency H. Thacker and others, Plant mediated synthesis of Iron nanoparticles and their Applications: A Review (10 July 2019).

4. Sivakumar and K. Amutha, Studies On Silica Obtained From Cow Dung Ash (22 October 2012).

5. Monica J. Hanus and Andrew T. Harris, Nanotechnology Innovations For The Construction Industry (20 March 2013).

6. O. Y. Ojedokun and others, Cow dung ash (CDA) as partial replacement of cementingMaterial in the production of concrete (British journal of applied science & technology)
(27th June 2014).

7. P. Thej Kumar and others, A study on the replacement of cement in concrete by using cow dung ash (December 2015).

8. B.G. Toksha and others, Auto-ignition synthesis of CoFe2O4 with Al3+ substitution for high frequency applications (27 July 2017).

9. Vinita Vishwakarma and D. Ramachandran researched green concrete mix using solid waste and nanoparticles as alternatives (December 15, 2017).
10. C Venkatasubramanian and others did experimental studies on how cow dung ash and coconut fiber affect the strength of concrete (2017).

11. Yousef Al-Salloum and others reviewed how microbial mineral precipitation can be used for bio-induction and bioremediation in cement-based materials (2017).
12.Alexandra Oglă Pintea and others looked at new types of mortars made by adding Traditional mortars with something from the Manufacturing Engineering Society International Conference (2017).

13. D. Ramachandran and Vinita Vishwakarma did detailed studies on cow dung ash modified concrete exposed to fresh water (February 21, 2018).

14. Run-Sheng Lin and others studied how cement pastes with calcined Hwangtoh clay hydrate and form microstructures (February 1, 2019).