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STUDY ON ADDITION OF COW DUNG (CD) ASH POWDER IN PORTLAND POZZOLANA CEMENT (PPC) WITH APPROPRIATE PROPORTIONATE TO FORM A CONCRETE

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ABSTRACT

*Cow Dung Ash is an additive that can be added in concrete for an increase in durability, workability, and strength of concrete using Portland Pozzolana cement (PPC). Partial replacement with PPC which varies from 1% to 10% at various proportionate with cement for M20& M25. All mix of concrete was examined for slump test and compressive strength for 3 days, 7days and 28 days. A Result test was found efficiently at 5%Partial Replacement of Cow Dung Ash as compared with other proportionate for M20 and M25 grade of concrete. 28 Days Compressive strength observed was **21.45** N/mm2 in M20 is good as per Indian code specification. 28 Days Compressive strength observed for M25 is **26.85** N/mm2 which is good. Cow Dung Ash acts as an additive and substituent for better strength and performance. Cow Dung Ash is manufactured by waste material of Cow solid waste drying and then burning and then collection its ash. Additive use here is part of waste material so the process is ecofriendly.*

Keywords: *Cow Dung Ash, PPC, M20 (Concrete Mix of 20 Grade), M25, Substituent Concrete.*

Introduction

Cement is a binding material used for infrastructure development in building, highway, flyover, bridges, roads etc. Most concretes are lime-based and silicates. Concrete could also be a cloth composed of coarse aggregate bonded in conjunction with fluid cement that hardens over time. In Portland cement concrete (and another hydraulic cement concretes), when the mixture is mixed alongside the dry cement and water, they create a fluid mass that is easily molded in shape. The cement reacts with the water chemically and other ingredients to create a troublesome matrix that associate all the materials together into a durable stone-like material that has many uses.

Accordingly, additives are added in the mixture to improve the physical properties of the wet mix or the finished material. The coarse aggregate was then included and mixed with cement and fine aggregate until the coarse aggregate was uniformly distributed throughout the batch. The cement and fine aggregate were being mixed dry until the mixture was thoroughly blended and was uniform in color.

The water was then be added and the entire mixture until the concrete appears to be homogeneous and has the desired consistency. The quantity of water was not entirely added at once, and it was added to mix at three steps of mixing for uniform mixing of water. If the repeated mixture was necessary, then it was done for homogeneous and uniformity of concrete.

The slump was also conducted for fresh concrete after the live mixing of concrete. Sand is a material composed of finely divided metamorphic rock and mineral particles as Silicates.

Stones are grained particulate matter, most mines material.

Water used for construction must be low TH, TDS with neutral pH value

Added appropriate material acts as Additives Concrete, is a mixture of coarse particulate material used in construction with cement and water.

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M20 concrete compressive strength of 20 N/mm^2 and formed by mixing of cement, sand, and aggregate in proportion 1:1.5:3.

M25 is 1:1:2 grade of concrete mostly used in residential building works

Cow Dung (CD) Ash Powder added in Portland Pozzolana cement (PPC) with appropriate proportionate for its better workability, durability & strength.

Literature Review

A Comparative Study on Cow-dung Ash and Bagasse Ash Concrete with Partial Replacement of Cement by Egg Shell Powder Avinash S Deshpande1, Nanjunda K N2, Purushottam T N3

International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 06 | June -2018 www.irjet.net p-ISSN: 2395-0072

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Detailed studies of cow dung ash modified concrete exposed in fresh water Author links open overlay panel Ramachandran DVinita Vishwakarma ViswanathanK Centre for Nanoscience and Nanotechnology, Sathyabama Institute of Science and Technology, Chennai 600119, India. Received 21 February 2018, Revised 10 July 2018, Accepted 10 July 2018, Available online 26 July 2018.

A study on use of cowdung ash and rice husk ash in concrete IJRET: International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308, Volume:04 Issue: 11 | Nov-2015, Available @ http://www.ijret.org 310 [4] V.S.R. PavanKumar.Rayaprolu (2012) : "Incorporation of cow dung Ash to Mortar and Concrete", (IJERA) VOL 2,VOL 3,ISSN:2248-9622,P.P 580-585.

Aim & Objective

- To develop better Workability, Durability, Compressive strength of designed concrete by use of PPC* and additives.
- Compare engineering properties for concrete performance conventional concrete, supplementary Cementatious material.
- Analysis of environment impact of different concrete with PPC.
- Identifying the life of structure.

It was observed that CDA can be used for increasing the workability and strength of concrete with partial replacement of cement.

Mainly highlights the significance and necessity of consumption of the waste material for manufacturing of sustainable. These materials are locally available and they can also reduce the cost of producing concrete for construction.

CDA concrete will have performed better in long term as compared to control concrete.

Working on partial replacement of cow dung ash with cement to form concrete

Process for Preparing Concrete by Partially Replacing Cow Dung Ash with Cement

- Collect samples of cement + sand + Aggregate + Water for making concrete sample.
- Process of weight batching method make 6-6 concrete cube samples size (150mm x 150mm) , of M20 and M25 concrete.

- Now we do partial replacements of cement with cow dung ash for various percentages at 1 to 10 percent.
- Do make 6 samples of 1% cow dung ash partially replaced with cement of M20 grade then 2%, 3%, 4%, 5% till 10% respectively of M20 grade concrete.
- Do make 6 samples of 1% cow dung ash partially replaced with cement of M20 grade then 2%, 3%, 4%, 5% till 10% respectively of M25 grade concrete.
- Do keep these cubes in curing tank
- Test each cube of 2 pair for 3, 7, 28 days for both M20 and M25 grade on compressive testing machine
- By this we will evaluate the result for 3, 7, 28 days of concrete test.

Properties of Cow Dung Ash

Cow dung ash is having pozzolanic qualities which can produce quality concrete structures. This study is focused on M30 grade concrete mix namely normal concrete and concrete modified with CDA.

	Cowdung ash
SiO_2	69.65
Al_2O_3	4.27
Fe_2O_3	2.99
CaO	12.55
MgO	2.22
SO_3	1.36
K_2O	2.94
Na_2O	0.57
P_2O_5	1.48
Mn_2O_5	0.63
TiO_2	0.33

General Terms on which Strength and Quality Depends

- **Workability**

Workability testing method was conducted as per IS 1191:1959, and the method is given below: The inside surface of the mold was thoroughly cleaned and free of extra moisture and any set concrete before commencing the test. The mould specimen was being placed on a smooth, horizontal, rigid, and non-absorbent surface, like a carefully leveled metal plate, the mould being firmly held in situ while it is being filled. The mould material is top-up in four layers, each approximately one-quarter of the peak of the mould. Each layer is blowed with tamping rod 25 times. The blowed being done in a uniform manner for the second and subsequent layers shall penetrate into the undergoes layer. The bottom layer was being tamped throughout its entire depth. After the top most layers have been rodded, concrete was being struck off level.

Mould was being erased from the concrete immediately by raising and rotating it slowly and carefully in a vertical direction. This allowed the concrete to subside, and the slump was measuring immediately by determining the difference between height of the mould and that of the highest point of the specimen being tested. The density of the specimen was determined before testing the specimen of the cube before the determination of the density of the specimen surface of the specimen was cleaned and swept with clean cotton cloths.

- **Compressive Strength**

The compressive strength of all mixes was measured with a cube specimen of size 150mm (length) x 150mm (width) x 150mm (depth). The specimens are tested after curing for three days, seven days, and 28 days fully immersed in the water tank as per IS 516:1959[5] for the method of tests for strength of concrete.

- **Slump**

The concrete slump test indicates the consistency of fresh concrete before it sets. It is done to see the workability of freshly made concrete, and thus the convenience with which concrete flows. It also can be used as an indicator of an improperly mixed batch. The test is popular thanks to the simplicity of the apparatus used and straightforward procedure. The slump test is employed to make sure uniformity for various a lot of concrete under field conditions.

Result

We have analyzed the result of work and entire blends /mixes in which there have been variations in the outcome of different combinations. Results have been tabulated graphically and presented. There have been various mixes of various type i.e., we have made two variations with cement. We have partially replaced cement with few percentages of Cow dung ash, which varies from 0% to 10% at an interval of 1%, to 10% for concrete mixes of M20 and M25.We have tested for density, slump, and compressive strength.

Observation & Testing Table

Results for testing of concrete cube without Cow Dung ash in M20 and M25 by compressive strength.

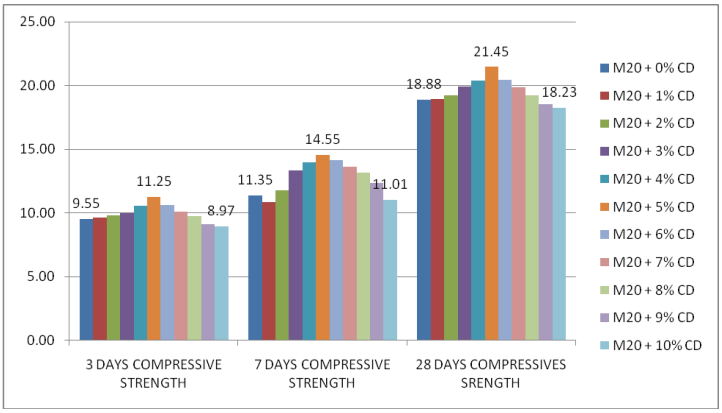
Grade of Concrete	3 days Compressive Strength	7 Days Compressive Strength	28 Days Compressives Srength
M20	9.55 Mpa	11.35Mpa	18.88 Mpa
M25	11.80 Mpa	16.11 Mpa	23.85 Mpa

Cow Dung Ash is Partially Replaced (5% by Weight) in PPC Cement to Form Concrete of M20 and M25 Grade

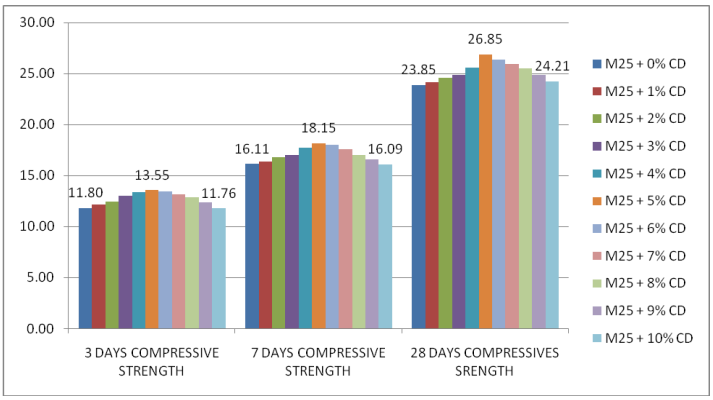
These are Some Test Results of Compressive Strength Testing is:

Grade of Concrete	3 Days Compressive Strength	7 Days Compressive Strength	28 Days Compressive Strength
M20	11.25 Mpa	14.55 Mpa	21.45 Mpa
M25	13.55 Mpa	18.15 Mpa	26.85 Mpa

Cow Dung (CD) Ash is Partially Replaced (1% to 10% by Weight) in PPC Cement to Form Concrete of M20 Grade



Cow Dung (CD) Ash is Partially Replaced (1% to 10% by Weight) in PPC Cement to Form Concrete of M25 Grade



Photographs





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