Study on Concrete With Partial Replacement of Cement By Cowdung Ash

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Abstract- *The Project Report deals with the Partial replacement of Cement by cowdung ash(CDA) in Concrete. The various Tests like Cement test, Aggregate test are performed to predict the properties of materials used in concrete and also various tests to be done to find properties of fresh and Hardened concrete. The Compressive strength of partial Replacement Cowdung ash (5%,10%,15%,20%) in Concrete is compared with Conventional Concrete. The strength test results are determined at an age of 7,14, and 28 days Curing . It was observed that optimum content of CDA is 10% at that content maximum compressive strength is achieved. While workability decreases when increasing % of CDA in concrete. CDA as partial replacement of ordinary Portland cement(OPC) in M20 mix proportional ratio 1:1.5:3 is used.*

Keywords- Ordinary Portland cement(OPC), Cowdung Ash(CDA), Cement concrete, Compressive strength.

I. INTRODUCTION

Concrete is the most popular building material in the world. However, the production of cement has diminished the limestone reserves in the world and requires a great consumption of energy. River sand has been most popular choice for the fine aggregate component of concrete in the past, but overuse of the material has led to environmental concerns, the depleting of securable river sand deposit and a concomitance price increase the material Therefore, it is desirable to obtain cheap, environmentally friendly substitutes for cement and river sand that are preferable by product. Concrete is the world's most utilized construction material . The need for infrastructural development in both the developing and developed countries has placed a great demand on Ordinary Portland Cement (OPC) since its invention in the first half of the 19th century Portland cement has become the most widely available material.

COW DUNG ASH (CDA)

Cow are one of the numerous species of cattle family commonly available in all the part on the world they are employed field operations like ploughing, harrowing ,sowing and inter-cultivation etc., while some may looks at cow as source of meat , dairy products and some other use the Michigan state university have found more sustainable and abundant , yet equally usefull bovine by produce manure. Surprisingly , the material , when sterilized, is entirely odorless and offers some wonderful characteristics for the production of variety of fiberboard building materials. The manure essentially replaces the role of sawdust in the production of particle boards, which would cut down wood usage as well as posing a creative solution of huge .

The cowdung is said to have strong antibacterial properties it works as a good disinfectant by keeping house cool in summer and warm in winter cow dung's used as construction material for house encourages utilization of material resources and minimizes wastages. In this CDA was obtained from rural housing the cow dung is collected and dried for an period of 12 days and it is burned to form an ash which is added to cement by partially replacing from 5% to 20% the cow dung is an good.

II. METHODOLOGY

This project follows the steps given below:

- Collection and study the material properties required for making a concrete.
- Testing of the material
- Mix proportioning of concrete (M_{20}).Investigation of strength parameter like Compressive, strength of conventional concrete V_s cowdung ash replaced concrete.

III. MATERIAL PROPERTIES

A. Cement Tests

Cement is binder, that can sets and hardens independently and is used to bind some other materials together. the volcanic ash and crushed pulverized brick additives are altogether added to burn lime to obtain a

hydraulic binder were later called as, and cement. cement which is used in construction is characterized as hydraulic. Cement is obtained by pulversing clinker formed by calcining raw materials primarily comprising of lime (CaO), silica (SiO2), Alumina (Al2O3), and ferric Oxide (Fe2O3) along with some minor oxides the aggregate together to produce a continuous compact mass. concrete mass in a given condition depends on the type, quality, and quantity of cement.

Table 1

S No	Description	Value
1	Fineness of cement	6.66
2	Standard consistency	32%
3	Specific gravity	2.69

B. Fine Aggregate Tests

The fine aggregate confirms to Zone II and is designated as fine sand. All tests are carried out as per IS: 383-2000.

Table 2

.No	Name of the Test	Test Value
1	Specific gravity of fine aggregate	2.60
2	Sieve Analysis	4.61
3	Water Absorption	11.4

C. Coarse Aggregate Tests

Aggregate are obtained by crushing various types of granites, schist, crystalline and lime stone and good quality sand stones.

Table 3

. No	Description	Value
1	Specific gravity	2.67
2	Flakiness Index	31%
3	Water Absorption	2.5%
4	Impact value	32%
5	Sieve Analysis of coarse aggregate	3.90

D. Fresh Concrete Tests

Table 4

S. No	Title	Result
1	Slump cone test	180mm
2	Compaction factor	0.853

E. Mix Proportions

Table 5

Grade of Concrete	Cement (Kg/m^3)	Fine aggregate(Kg/m^3)	Coarse aggregate (Kg/m^3)	Water (liter)
M_{20}	383	546	1187	191.6
	1	1.42	3.03	0.5

IV. EXPERIMENTAL INVESTIGATIONS

A. Compressive strength

The compressive strength of concrete is one of the most important properties of concrete. Comparative strength if M_{20} grade of concrete for the partial replacement of cowdung ash (CDA) by crushed was found. In this test 150x150x150mm concrete cubes were cast, by using 30 Mpa concrete. The mixing was done by cubes were remolded and placed under water and cured for 28 days. Then the cubes were tested for their crushing strength at 7, 14 and 28 days.

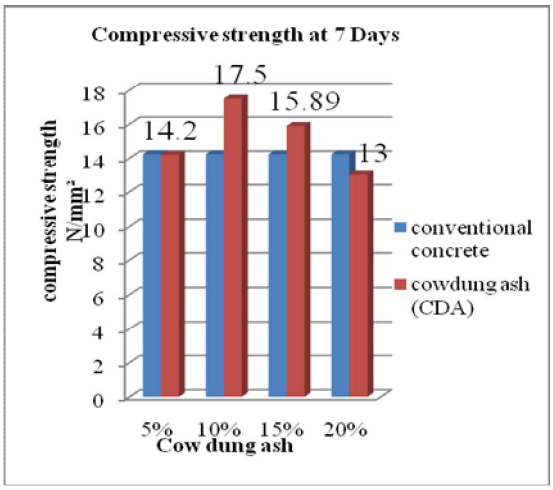
$$\text{Compressive strength (Mpa)} = \frac{ultimate\ load}{cross-sectional\ area\ of\ cube}$$

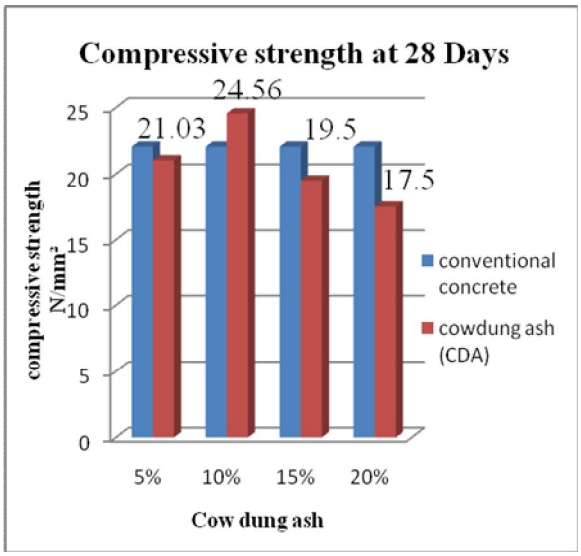
V. RESULTS AND DISCUSSIONS

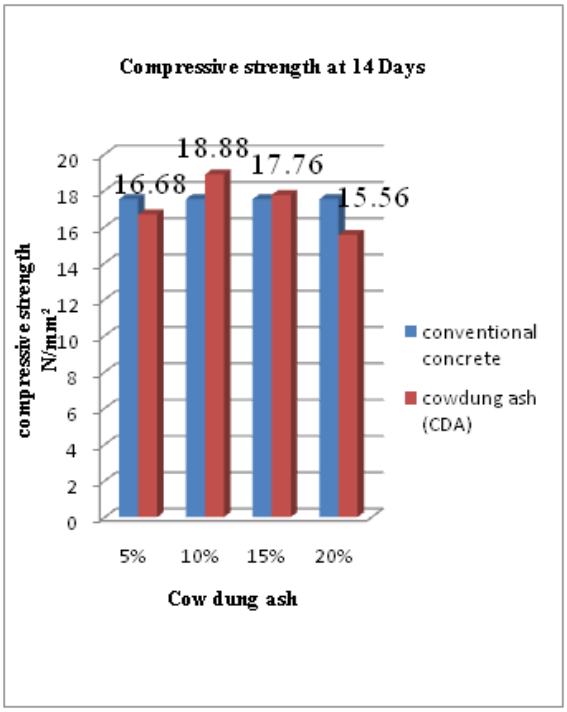
A. Compressive strength

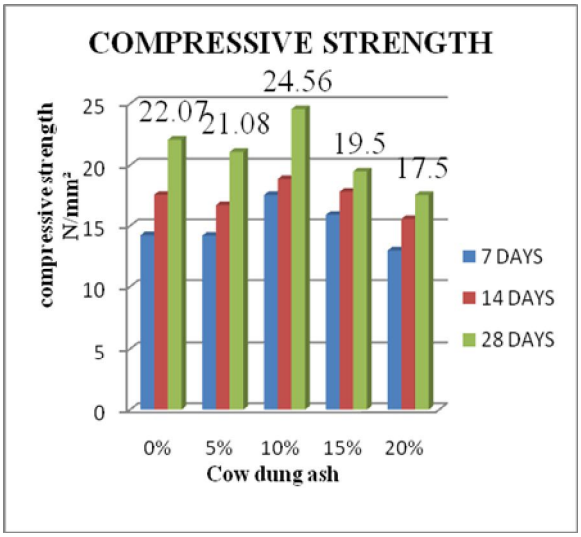
Table 6

S no	Mix (%)	Average Compressive strength (N/mm^2)		
		7days	14days	28days
1	Conventional	14.24	17.52	22.07
2	5%	14.20	16.68	21.08
3	10%	17.5	18.88	24.56
4	15%	15.89	17.76	19.5
5	20%	13.0	15.56	17.5









VI. CONCLUSION

Experimental investigations carried out to study the cow dung ash on the strength of mortar and concrete. Cement was partially replaced with four percentages (5%, 10%, 15%, and 20%) of cow dung ash by weight.

The compressive strengths of the mortar and concrete specimens were determined at 7, 14 and 28 days respectively.

Test results indicated that the consistency limits increased up to an optimum content and decreased further with the increase in the % of CDA in cement.

The compressive strength is increased when the cement is replaced by 10% of CDA and decreased with the increase in the cow dung ash content. Hence, it is concluded that the 10% cement can be replaced with CDA in mortar.

The compressive strength of the concrete is reduced with the increase in CDA and in strength increase with the increase in curing days.

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