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Use of Cow Dung Ash in Eco Friendly Concrete

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ABSTRACT

It has been estimated by World Health Organization (WHO) that about 5% of total CO2 released into the atmosphere is from cement industry. Besides being an natural toxin, the measure of warmth energy needed for creation of concrete is around 1500 °C which requires more energy. Cement concrete produced with ordinary cement are to be replaced by eco-friendly concrete. Locally available waste material like rice husk ash, cow dung ash, animal waste ash etc can be a better option for the replacement of cement in concrete up to an extent. This paper presents the possibility of utilizing Cow dung ash (CDA) as a supplementary cementing material in cement concrete. Trial examinations completed to concentrate on the cow waste debris on the strength of cement. Concrete was to some extent supplanted with four rates (5%, 10%, 15%, and 20%) of cow manure debris by weight. The compressive strength & flexural strengths of the concrete specimens were determined at 7, 14 and 28 days respectively. From the outcomes significant ends can be attracted terms of different boundaries like workability, flexural strength & compressive strength.

KEYWORDS: *Cement Concrete, Cow Dung Ash, flexural strength, Strength parameters, water absorption, Workability*

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I. INTRODUCTION

Concrete being most broadly utilized as a development material across the globe, with principle fixing as water, fine total and coarse total, blended in legitimate extents to get clear cut conduct for expected reason. The planned reason relies upon the spot and sort of kind of construction where it is being utilized. The necessary properties might be distinctive for building, tall structure, spans, dams, asphalt and some more. The properties of substantial should be seen in two states for example new and solidified cement. It properties relies upon extent of its fixings and fixings individual physical and compound properties. As the fixings utilized are essentially crude material and it accessibility and properties differs from one area to another. In this manner the reaction or conduct of cement relies upon many variables and each factor need to tended to appropriately for legitimate working of the substantial in short and long 7 term as well. In after sub area the properties individual fixing, it's effect or commitment on substantial properties with indicated research facility tests are examined.

Presently a day's heaps of creation in the field of concrete innovation that can control the implementation of Cement in concrete. On the off chance that there will be the substitute of fine aggregates, i.e. sand with wooden dust with other material. At that point there will be the less emanations of Co2 in condition. As we are utilizing the manufacturing waste material to deliver a superior quality concrete. The natural issue can fathom by the substitute of industrial squanders and by item. The substitute of fine aggregates (sand) with the assistance of squander materials (wooden powder) can be gainful for the structure, condition. Subsequently, the characteristic of concrete are change, for example, workability, pressure test, elongation index etc.

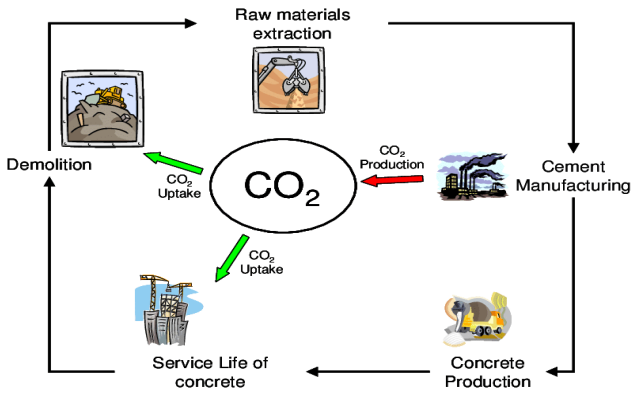

Fig. 1. Aspects of concrete Production

Cows manure ash (CMA) is a mechanical waste produced by biomass power plants. ... To get distinctive molecule size of cows excrement debris, we utilized a mute heater to re enact the biomass power burning temperature (500 °C, 650 °C, and 800 °C). It is utilized to repulse mosquitoes and as a minimal expense warm cover. Cow fertilizer is likewise a potential constituent in the assembling of adobe mud block lodging. Likewise, cow compost debris (CDA) is utilized as an adsorbent for sequestering weighty metals present in wastewater. Cow fertilizer debris which is acquired by drying and consuming of cow excreta has alum inosilicate content. It is massive and has an enormous debris content reaching a nitrogen rich material, potassium, phosphorus and calcium.

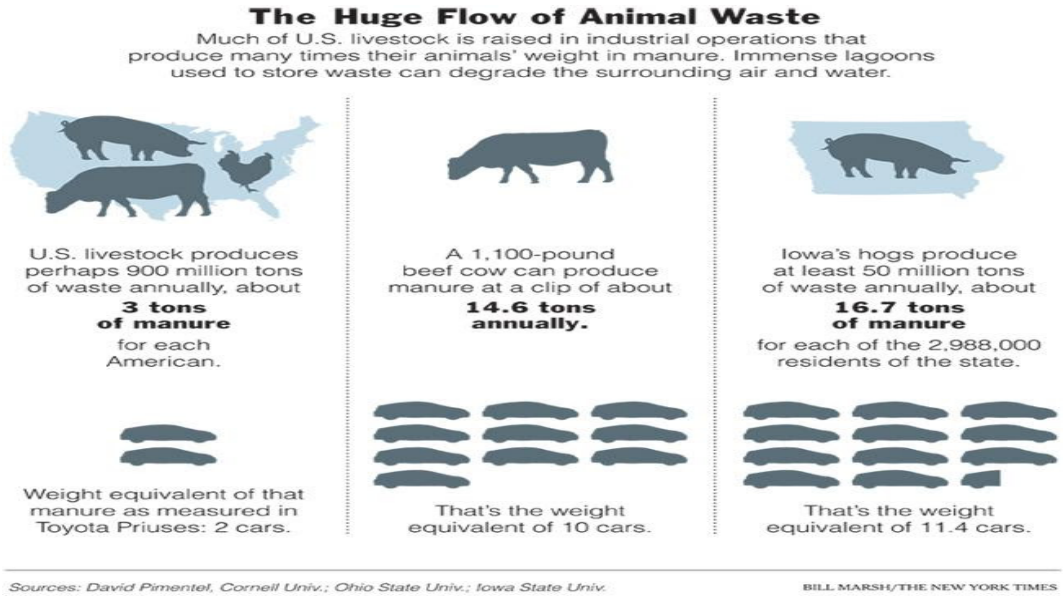

Fig. 2. Production of Cattle Manure Worldwide

Cow Dung debris is acquired by drying and consuming of dried cowdung taps and has huge substance of Nitrogen, Potassium, Calcium, Carbon and requires a limit of 400°C of coconut fiber,which is a farming and food squander. in certain sum in concrete demonstrates to work on the strength of cement. either coconut fiber or cow excrement debris over a specific worth might diminish the strength of cement then again. In this way, it is important to discover the ideal worth of substantial which keeps up with the strength with decrease in concrete substance. substitution of concrete in substantial utilizing cow excrement debris and coconut lie content with ideal measure of incorporation of these two materials for better strength execution of cement. This may, in future can prompt utilization of waste as development materials everywhere scale after different examination works did at different scale.

Fig. 2. Alternate Material Used.

II. MATERIAL USED

The following materials are used during the research work-

- Cement
- Fine aggregates (Sand)
- Coarse Aggregates(12.5 -20mm)
- Coarse Aggregates(10mm)
- Cow dung Ash
- Plasticizer as admixture
- Water

Fig. 3. Ordinary Portland Cement (53 grade)

Fig. 4. Fine Aggregate (River Sand)

Fig. 5. Coarse Aggregates (20 mm)

Fig. 5. Cow Dung ash

III. METHODOLOGY

Following cases were considered to analyse the problem:

Table 1 Cases Considered

S. No.	Specimen ID	Cement %	Coe Dung Ash %
1	M0	100	0
2	M5	95	5
3	M10	90	10
4	M15	85	15
5	M20	80	20

STIPULATIONS FOR PROPORTIONING

Table 2 CONCRETE MIX DESIGN PARAMETERS

S. No.	Parameters	Data
1	Characteristic Compressive Strength	30 MPa
2	Type of cement :	OPC Grade-53 (Ultra tech)
3	Specific gravity of cement	3.15
4	Nominal maximum size of Coarse aggregate	10 mm & 20 mm
5	Type of Coarse aggregate	Crushed natural stone aggregate
6	Type of fine aggregate	Natural River Sand
7	Water cement ratio	0.42
8	Exposure condition	Severe
10	Admixture used	Super Plasticizer
11	Slump value	True Slump 120 mm

Table 3 FINAL MIX DESIGN RESULTS

S. No.	SPECIMEN ID	Cement %	Cow Dung Ash %
1	M0	100%	0%
2	M5	95%	5%
3	M10	90%	10%
4	M15	85%	15%
5	M20	80%	20%
Grade of concrete		M 30	
Adopted mix proportions		**1**: **1.89**: **2.78**	

IV. RESULTS

Results For **Workability** parameters.

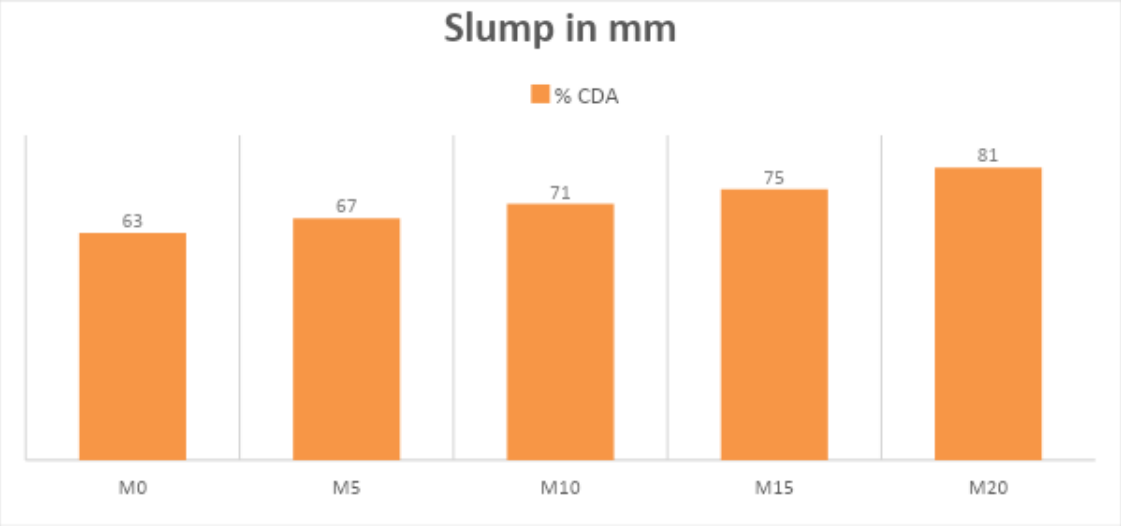

Fig. 6. Slump Values of Different Waste Material

Results For **Strength** parameters

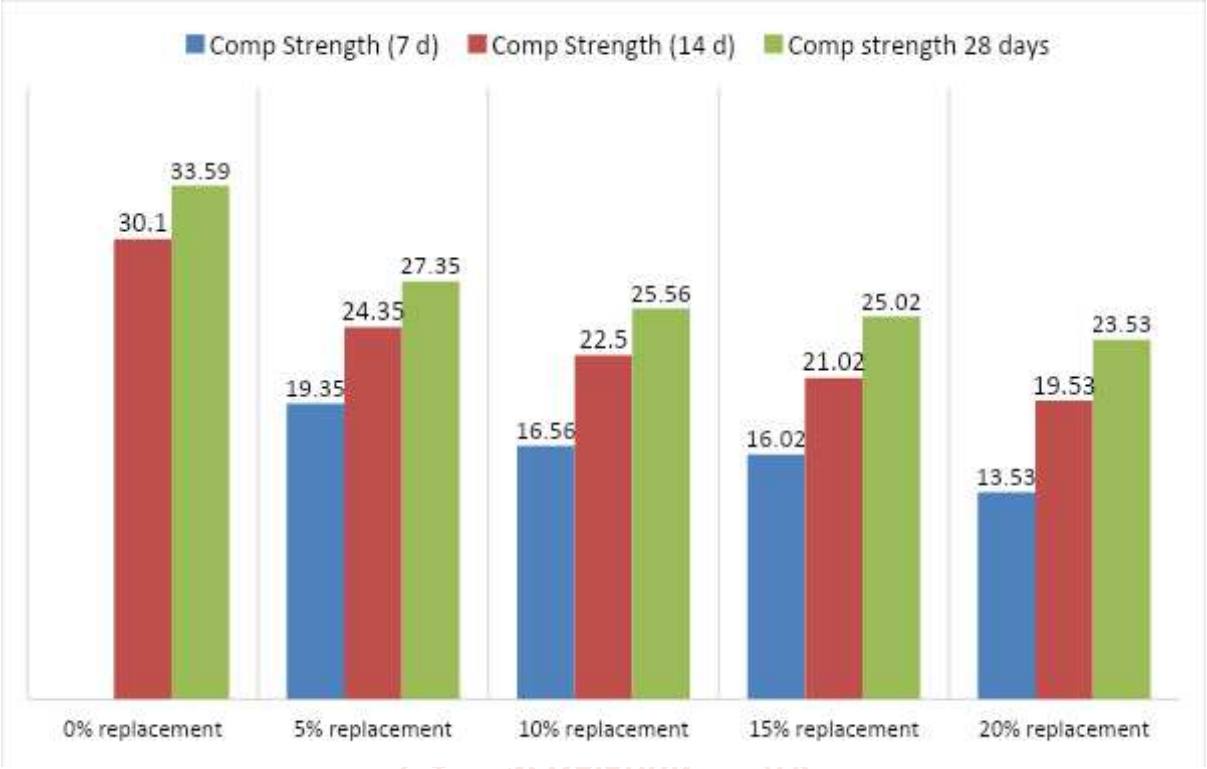

Fig. 7. Comparison of Compressive Strength of M30 Grade

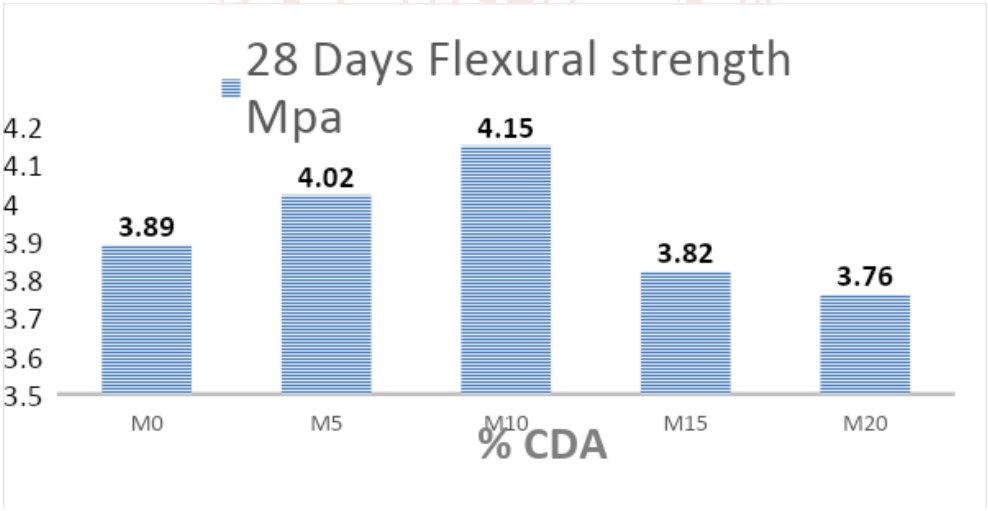

Fig. 8. Comparison of 28 days Flexural Strength of M30 Grade

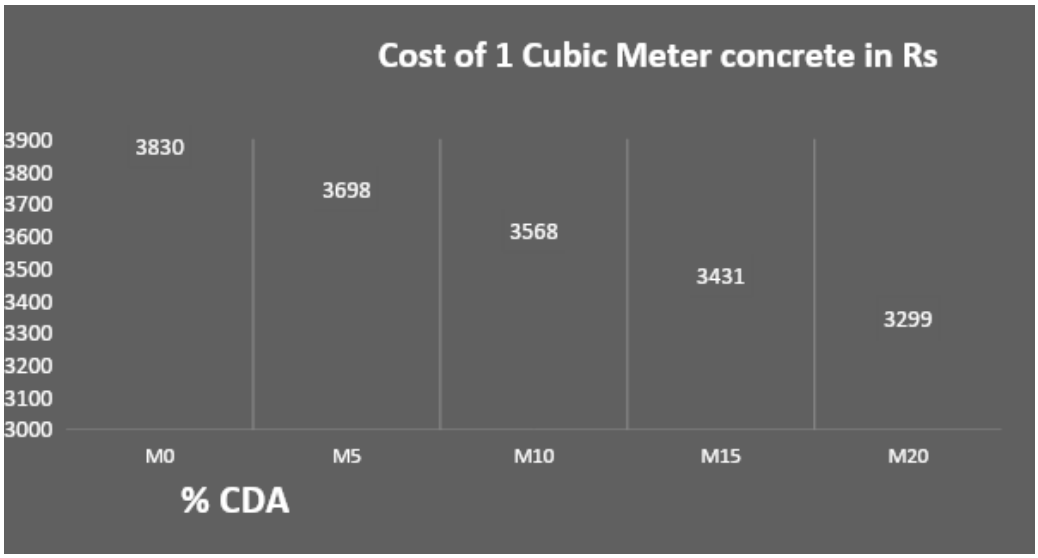

Fig. 9. Cost Comparison for different replacements

V. CONCLUSION

After comparing the values of different parameters with acceptance criteria it can be concluded that The optimum level for the replacement (by weight) of CDA for severe exposure condition i.e. M30 grade, is found to be 5% to 10%.CDA based concrete is an economic environmental friendly solution to agricultural dominant nations like India. The price of 1 ton of CDA is only a small fraction of one ton production of Portland cement.

Higher performance life has been achieved through this replacement and lower capital cost compared to the conventional concrete. Due to replacement of specific industry waste materials.

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