



STUDY OF COW DUNG ASH AND SUGARCANE BAGASSE ASH IN CONCRETE

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Abstract: In this paper we study about the properties of Cow dung ash and Sugarcane Bagasse ash in Self Curing Concrete. Today the consumption of water and other sources for concrete is high. For curing the concrete, there is a high demand for water for long duration. In this study cow dung and sugarcane bagasse ash is added to the Self curing concrete. To reduce the usage of water self curing agent is added. The compressive strength of conventional concrete and partial replacement (5%, 10%, 15%, 20%) of cement in concrete is studied for 7, 14 days.

INDEX TERMS - CDA – COW DUNG ASH, SBA – SUGARCANE BAGASSE ASH

1. INTRODUCTION

Concrete used for construction of buildings and bridges in India can be called as the back-bone to the Infrastructure development of the nation. But the increase in cost of cement and scarcity in river sand not increases the budget of the building but also poses a serious threat to the country's development. The entire construction industry is in search of a suitable and effective and alternative for the past one decade. Of late it is identified that some industrial waste products like rice husk ash, fly ash, bagasse ash and silica fumes are having some cementations and siliceous properties. The study was conducted to investigate the feasibility of using bagasse ash to replace some part of cement in Concrete.

Bagasse is fibrous residue obtained from sugar cane during extraction of sugar juice at Sugarcane mills. The average length of bagasse fibers is 80mm and their average thickness is 0.2mm. Bagasse Ash obtained from the burning of bagasse in the kiln of sugarcane mills. Bagasse Ash were collected from Dharani Sugar Industry, Vasudevanallur.

2. MATERIALS USED

The cement is a material that has cohesive and adhesive properties in the presence of water, consist primarily of silicates and aluminates of lime. The OPC (53 Grade) is used for this study. The fine aggregate are material passing through an IS sieve that is less than 4.75 mm gauge beyond which they are known as coarse aggregate. The main function of the fine aggregate is to provide workability and uniformity in the mixture. The fine aggregate uses in this study is locally available river sand which conforms to zone III as per BIS code. The coarse aggregate form the main matrix of the concrete, where as fine aggregate form the filler matrix between the coarse aggregate. The maximum size of aggregate used in this study is 20 mm. The coarse aggregate is confirmed by IS 383:1977 and is 20 mm maximum size. The cement, fine and coarse aggregates required for experimentation are tested in the laboratory and the results are shown in Table – 1.

Table - 1

Properties	Value
(a) Cement	
Specific gravity	3.15
Initial setting time	38 minutes
Final setting time	10 hours
Fineness of cement	0.233%
Standard consistency of cement	35%
(b) Fine Aggregate	
Specific gravity	2.62
Water absorption	1%
Fineness modulus	3.3
(c) Coarse Aggregate	
Specific gravity	2.60
Water absorption	0.5%

Fineness modulus	7.02
(d) Bagasse ash	
Fineness of Bagasse ash	0.566%
(e) Cow Dung Ash	
Fineness of Cow dung ash	0.566%

Mix Design for M20 grade concrete

189: 378: 537: 1287

0.5: 1: 1.42: 3.40

3. TEST RESULTS

Test Result for M20 (7 days curing)

7 days self curing concrete	% of Replacement	Load Applied	Compression Strength N/mm ²	Average N/mm ²
CDA – 15% SBA – 5 %		250000	11.11	10.88
		240000	10.66	
		245000	10.88	
CDA – 15% SBA – 10 %		260000	12.44	12.58
		265000	12.66	
		265000	12.66	
CDA – 15% SBA – 15 %		270000	12.00	12.14
		270000	12.00	
		275000	12.22	
CDA – 15% SBA – 20 %		280000	11.55	11.69
		285000	11.77	
		285000	11.77	

Test Result for M20 (14 days curing)

14 days self curing concrete	% of Replacement	Load Applied	Compression Strength N/mm ²	Average N/mm ²
CDA – 15% SBA – 5 %		320000	14.22	14.36
		320000	14.22	
		330000	14.66	
CDA – 15% SBA – 10 %		345000	16.88	17.04
		350000	17.11	
		350000	17.11	
CDA – 15% SBA – 15 %		360000	16.00	16.14
		365000	16.22	
		365000	16.22	
CDA – 15% SBA – 20 %		380000	15.33	15.47
		385000	15.55	
		385000	15.55	

4. CONCLUSION

Partial replacement of cement by bagasse ash and cow dung ash at 10% and 15% improves the strength properties of concrete

The cost can be reduced up to 12% in the total estimation of the concrete.

5. REFERENCES

1. Study of bagasse ash in Concrete - R.Srinivasan, International Journal for Service Learning in Engineering
2. Detailed studies of cow dung ash modified concrete exposed in fresh water- RamachandranD, Journal of Building Engineering
3. Use of Cow Dung Ash as a Partial Replacement for Cement in Mortar - Deepam Kamat* Omprakash Gupta, International Journal of Engineering Research and Technology
4. EXPERIMENTAL STUDIES ON EFFECT OF COW DUNG ASH (POZZOLANIC BINDER) AND COCONUT FIBER ON STRENGTH PROPERTIES OF CONCRETE - C VENKATASUBRAMAN, D MUTHU - IOP SCIENCE
5. To study the mechanical properties of Cow dung ash modified concrete - Aishwarya suresh , Ardra M, International Journal of Scientific & Engineering Research Volume