

MECHANICAL INVESTIGATION ON WOOD ASH AND DIFFERENT ADMIXTURE BASED CONCRETE

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ABSTRACT

Increasing wastages leads to land disposal related to the social issues, accumulated to their huge amount of land filling elements. In general cement is an artificial resources, normally fine grain structure and mixed al the chemical content and water conformal characteristics. But this artificial material some effect of causes to the environmental effects such green house effects. Recent researchers work with lot of various industrial wastes and reuse materials. Similarly wood ash is an essential part of this concrete. This paper investigates the effect of wood ash to the tensile, compressive, and flexural tests explained in detail. The wood ash content mixed with addition of 0%, 15%, 25 % and 35% respectively remaining cement enhanced. This proportions of wood ash admixtures with the concrete M35 grade.

Keywords: Wood ash, Compressive, Flexural.

I.INTRODUCTION

In recent trends lot of demands their renewable energy resources .Similarly for the agricultural wastages and power plant to providing fuel in continuous manner. And low cost analysis regeneration of fuel and reproducing of wastages. It causes some defects to the environmental and avoiding method transportation cost is economically high. The solid level wastage management has to overcome this problem respectively [1]. MichelleS. Reported ancien admixtures, jiggery and egg were used as an existing house build with egg mixed material. After that cement used in this building, effect of house gas produced. Some of the researchers to overcome this problem partially [2]. Most developing countries easily affordable price to building the construction and enhanced with the eco friend infrastructure with the environmental. [3-6]. Wood ash is an partial replacement of concrete with the alternate disposal method of wastages. Where admixture with the cement use of wood ash to developed the properties of the concrete. And cost effectively, rapidly growth with the destroyed wastages. Some of the workers the wood conventionally admixtures, cost effectively and helps to easily degradable with the unmanageable waste. The researchers to proved rice husk ash with cement better properties. [7-8].

Similarly Abdullahi.M [9]. Reported by the wood ash use in cement by different proportion. And explained hydration process to the wood ash content. And also Saw dust admixtures with the cement aggregate proved by the [10] Marthong. Cheah Chee Ban , investigated high calcium ash with cement of pozzolanic property.[11]

This investigation admixture with wood ash with the 0%, 5%, 15% and 25% to the cement and enhanced with good tensile, compressive properties and flexural experiments. The results compared to the previous updated data. The results clearly ensure that to reduce the house gas and eco friendly to the environment. and to reduce the wastages of fly ash respectively

II.MATERIALS

Concrete most widely used in the wide variety of industrial applications. This material has good workability and densification and better durability. And some development needs to change their material characteristics, it belongs to the situations. The alternative solution is found to be a admixture with different kinds of materials. From the literature reviews the wood ash used limited applications only with unless information's. The cement ops grade 53 used and specific gravity is 3.10. And coarse aggregate and fine aggregate used for the suitable limit of the concrete structure. For water content use with suitable combinations of chemical and acidic substance deposited. Wood ash collected from the byproduct combustion near the industries.

Table 1 Wood ash

Oxide Compos ition	WA
SiO ₂	46.05
CaO	18.23
Fe ₂ O ₃	8.12
Al ₂ O ₃	7.55
MgO	2.1
K ₂ O	4.2
Na ₂ O	1.5
TiO ₂	0.1
MnO	2.85
P ₂ O ₅	1.7
SO ₃	1.4
LOI	6.2

Table 1
Physical properties of cement.

Particulars	Test result	Requirement as per IS:12269-1987
Physical properties		
Specific gravity	3.15	
Fineness (m ² /kg)	315.4	Min. 225 m ² /kg
Soundness		
Lechatier expansion (mm)	0.8	Max. 10 mm
Auto Clave expansion (%)	0.01	Max. 0.08%
Setting time (Minutes)		
Initial	45	Min 30 mints
Final	230	Max. 600 mints

Table 2
Chemical properties of cement.

Particulars	Test result	Requirement as per IS:12269-1987
Chemical composition		
% Silica (SiO ₂)	19.29	
% Alumina (Al ₂ O ₃)	5.75	
% Iron oxide (Fe ₂ O ₃)	4.78	
% Lime (CaO)	62.81	
% Magnesia (MgO)	0.84	Not more than 6.0%
% Sulphuric anhydride (SO ₃)	2.48	Max. 3.0% when C3A > 5.0 Max. 2.5% when C3A < 5.0
% Chloride content	0.003	Max. 0.1%
Lime saturation factor CaO	0.92	0.80 to 1.02
0.7SO ₃ /2.8SiO ₂ + 1.2Al ₂ O ₃ + 0.65Fe ₂ O ₃		
Ratio of Alumina/Iron Oxide	1.21	Min. 0.66

Cement 53 properties as shown in table 1 and table 2 to IS 12269:1987 [14].

III RESULT AND DISCUSSIONS

The chemical composition of wood ash shown in table 1. This properties admixture with the concrete.

Compressive Strength

Naik et al reported about the compressive strength 365 day for the admixture of wood ash [13]. The adding percentage 0%, 15%, 25% and 35%. Compressive result of the figure as shown in below. The compressive strength 48 Mpa for 28 days. And adding wood ash due to pozzolanic effect, 62 Mpa for 365 days. Similarly 28 days compared to large percentage ratios, to the total bonding weight of the control mixture. Similarly tensile strength shown in figure .from the observation the tensile strength can be calculated number of days. From partial replacement of wood ash, 7 days to 365 days proportion decreasing tensile strength and increasing proportions compared to the compressive strength. Adding small amount of wood ash to decrease the tensile strength and large wood ash to creating a good bonding strength. Thus the graphical variation showed in the figure.

The replacement of wood ash content for the flexural test of 28 days achieved 5MPa and similarly 365 days to achieving 8.8 MPa respectively for the adding replacement of fly ash.

The result form the graphical shows, replacement of 05,15%, 25% and 35 %. Enhanced the flexural strength in the range of 65% to 75%.

The influences of wood ash replacement 10%, the weight loss compared to the base material and increasing the wood ash content. The maximum compressive strength immersed due to H_2SO_4 . So increasing compressive strength the percentage of acid increased. For minimum weight loss due to low acid attack.

The compressive strength and tensile strength for the experimental analysis 20% adding wood ash good binding weight to the concrete. The chemical composition of wood ash presence with CaO, SiO_2 , and the smallest amount Fe_2O_3 , Al_2O_3 and K_2O . The admixture with the compressive and flexural strengths of the mixes were then compared, which are the most important mechanical properties of concrete in concrete mix design. Cubes of 100 mm and 100 mm x 100mm x 500 mm beams were used for testing the compressive and flexural strength development respectively under the standard curing conditions for 3 days, 7 days, 81 days and 365 days respectively. Three preloading cycles, using the same loading and unloading rate, were used. One hundred and sixty-eight specimens of 500 mm x 100 mm x 100mm beams, cubes of 100 mm and cylinders of 100 mm diameter 300mm were casted to find the compressive, tensile and flexural strength

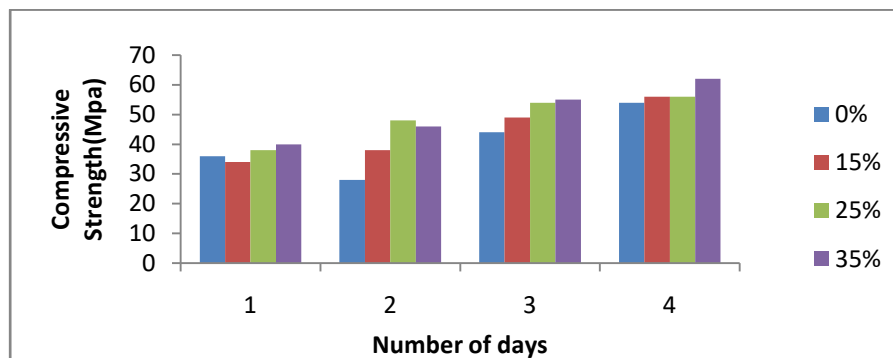


Figure 1. Compressive strength

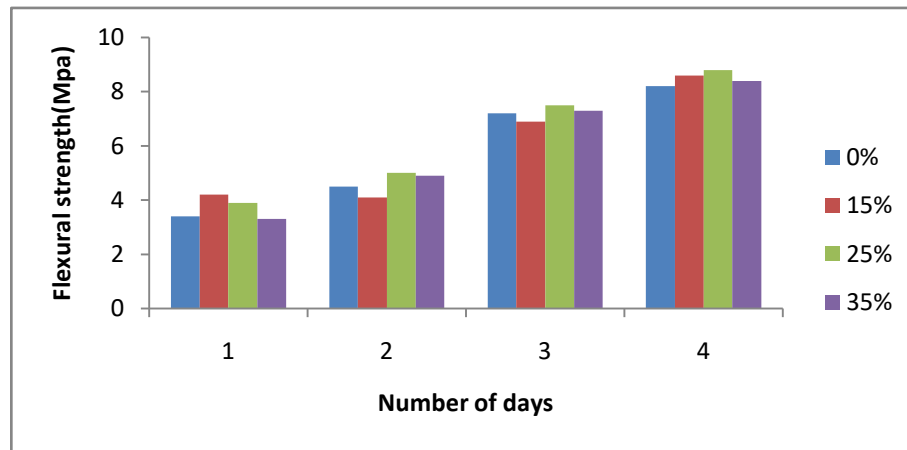


Figure 2. Flexural strength

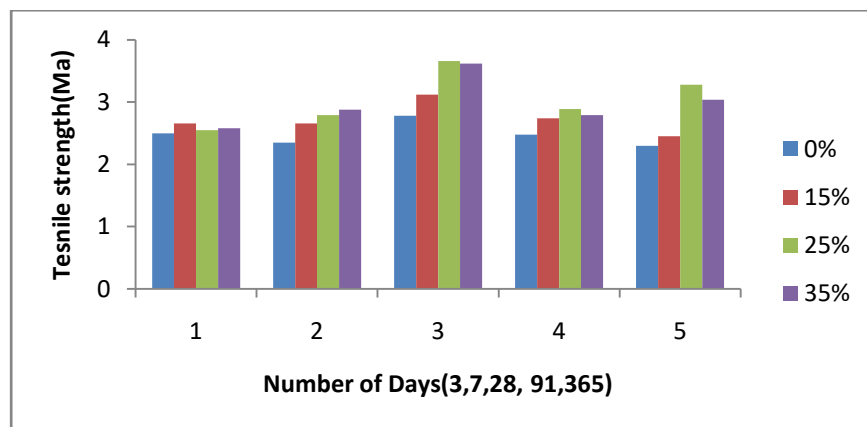


Figure 3. Tensile strength

IV. CONCLUSION

- ✓ Concrete adding with wood ash 0%, 15%, 25% and 35% for increasing strength due to good pozzolanic effect.
- ✓ The replacements of 10% concrete the binding energy good agreement with the experimental results.
- ✓ Decreasing strength and increasing wood ash content the life time for number days will be increased.
- ✓ From the experimental results adding wood ash it have no negative impact.

- ✓ Adding 25% wood ash to ensure that hydration and high compressive strength compare to the pure concrete.
- ✓ The wood ash content admixture with the good results to the previous experimental results from the literature survey.

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