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EXPERIMENTAL INVESTIGATION ON CONCRETE USING BAMBOO LEAF ASH AND PAWPAW LEAF ASH

Miss. Sakshi A. Zambre*1, Prof. G.D. Dhavale*2, Asst. Prof. V.A. Kalmegh*3

*1PG Scholor, Department of civil engineering , BDCE, Sevagram, Wardha, Maharashtra, India.

*2Professor, Department of civil engineering, BDCE, Sevagram, Wardha, Maharashtra, India.

*3Assistant Professor, Department of civil engineering, BDCE, Sevagram, Wardha, Maharashtra, India.

ABSTRACT

The present study is aim to develop a high strength concrete by using mineral admixtures of bamboo leaves ash and pawpaw leaves ash. In order to check the compatibility, physical and chemical properties of materials are studied. This aims to provide a comprehensive review of recent trends incorporating biomass ashes from agricultural waste in ordinary Portland cement (OPC).The material properties of different leaf ashes and their effect on fresh and hardened concrete properties (i.e., mechanical and durability properties) are reviewed. Partial replacement of OPC with byproducts , such as bamboo leaf ash,pawpaw leaf ash. It will also contribute to the effort of achieving zero waste technology and sustainable development.

Keywords: Bamboo Leaves Ash, Pawpaw Leaves Ash, Agricultural Waste, Compressive Strength, Flextural Strength, Split Tensile Strength.

I. INTRODUCTION

Concrete is most widely used human made material in existence. It is the second most consumed substance on the planet after water, mainly due to its low cost ,versatility, and durability. Due to infrastructure developments and mushrooming population worldwide, it is one of the most versatile and heterogeneous construction material ever discovered.

In cement industries continuous makes an attempt are being created (1) to scale back the price of production of hydraulic cement, (ii) to scale back the consumption of the raw materials. (ii) to shield the atmosphere and (iv) to boost the standard of cement a method is to use sure low value materials for partial replacement of hydraulic cement clinker. Low value materials used are industrial and agricultural by-products (wastes). Mixture of hydraulic cement and therefore the on top of by-products are called blended cements or composite cements. By definition integrated cements are hydraulic binders during which a neighborhood of hydraulic cement is replaced by alternative hydraulic or non hydraulic materials. Their general behavior is sort of like that of hydraulic cement since they harden once mixed with water and kind an equivalent association product. the foremost common ingredients for mixing with hydraulic cement clinkers ar latent hydraulic component(blast chamber slag), or a pozzolanic element like pozzolana, fly ash, rice husk ash, condensed oxide fume, burnt clay or filler element like lime stone and alternative waste materials.

II. EXPERIMENTAL PROGRAM

2.1 Materials

2.1.1 Cement

In the gift study OPC fifty three grade cement for style combine. The various properties of cement square measure examined i.e. compressive strength, lastingness, and flexural strength when 7days, 28 days, fifty six days and ninety days.

2.1.2 Coarse aggregate

The twenty millimeter size combination. The coarse combination with a size of twenty millimeter were tested. The properties of coarse combination investigated

2.1.3.Fine aggregate

The purpose of fine combination is to fill the voids within the coarse combination and to act as a workability agent. stream sand was used as fine combination. the dimensions of the sand used is four.75 millimeter and down size. The properties of (sand) investigated.

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2.1.4 Bamboo Leaf Ash (BLA)

BLA used for experimentation is collected from wardha district in state geographical region and processed to size but forty five metric linear unit to replaced with cement.

2.1.4 Pawpaw Leaf Ash (PLA)

The PLA is employed for experimentation is collected from village mohi in wardha district state geographical region and processed to size but forty five metric linear unit to replaced with cement.

2.2 Mix design for Concrete

The main objective of experimental work is to investigate compressive strength, split lastingness and flexural strength of concrete. M25 grade of concrete is employed to look at the mechanical properties of concrete with 0.50 water-cement quantitative relation. the combo style was ready to look at the properties of concrete as per IS 10262-1982.

III. RESULTS AND DISCUSSION

3.1 Compressive Strength

The 150 mm cube mould are used for testing the compressive strength after 7 days,28 days,56 days and 90 days as per IS: 516-1959. Specimens has been made for control mix and compared with different percentages replacement of cement with BLA i.e. for 5%, 10%, 15 % and 20 % by weight. Specimens were tested after7 days and 28 days,56 days and 90 age of curing and average results of are shown in Figure 1.

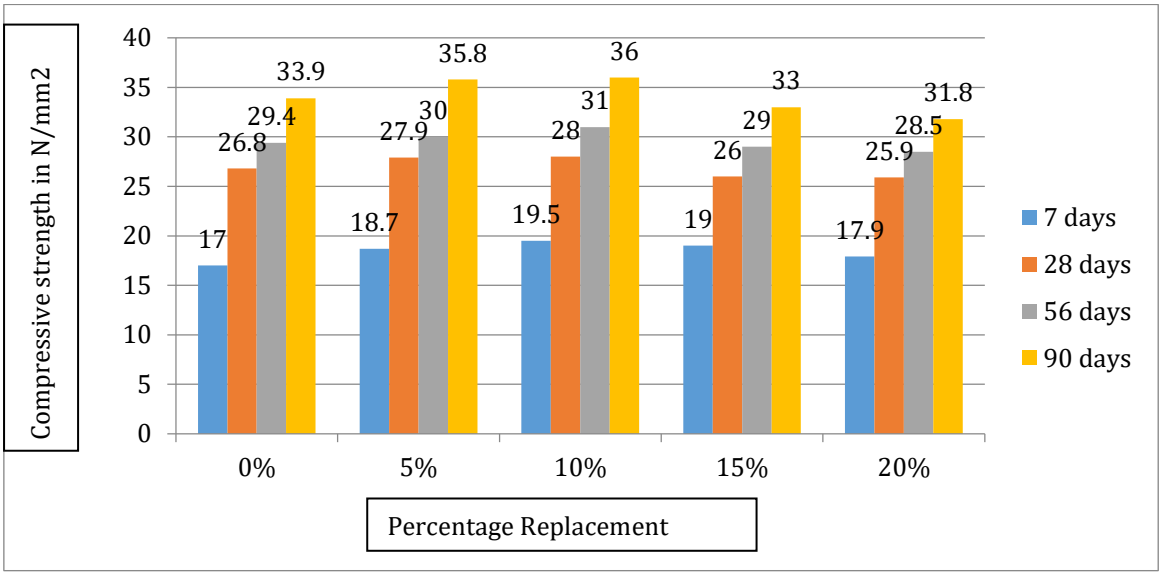

Fig 1: Compressive Strength of BLA

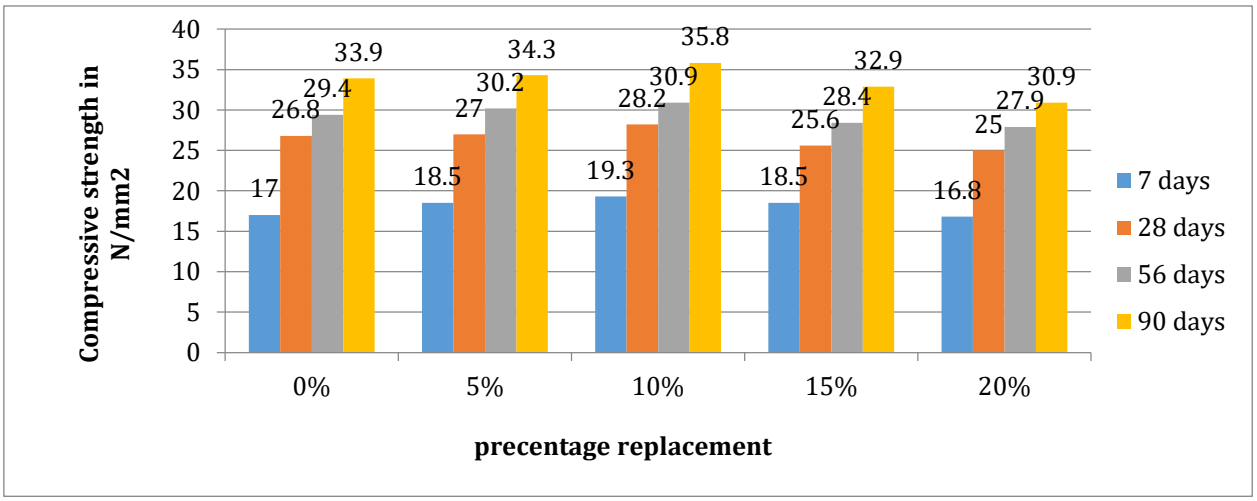

Fig 2: Compressive Strength of PLA

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3.2 Flexural Strength

The beam specimens 100mm x 100mm x 500mm were used for testing the flexural strength after 7 days,28 days,56 days and 90 days. Specimens has been made for control mix and compared with different percentages replacement of cement with BLA and PLA i.e. for 5%, 10%, 15 % and 20 %. The flexural strength after 7 days,28 days,56 days and 90 days discussed in given Figure 3.

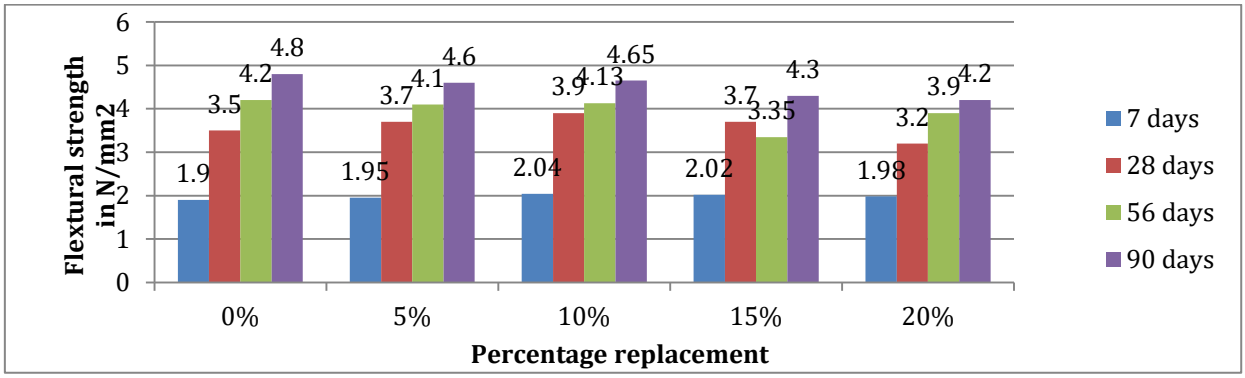

Fig 3: Flexural Strength of BLA

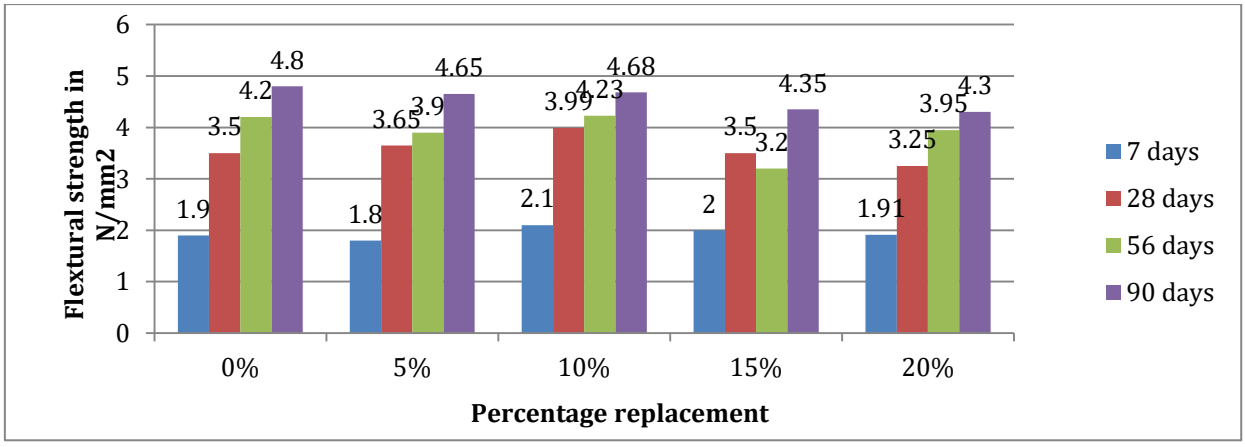

Fig 4: Flexural Strength of PLA

3.3 Split Tensile Strength

The 300mm x 150 mm cylinder were used for testing the split tensile strength after 7 days,28 days,56 days and 90 days. Specimens have been made for control mix and compared with different percentages replacement of cement with BLA and PLA i.e. for 5%, 10%, 15 % and 20 %. The split tensile strength of all the mixes was determined at the age of 7 days, 28 days,56 days and 90 days. for various replacement levels of BLA and PLA in concrete mix and discussed in Figure 5.

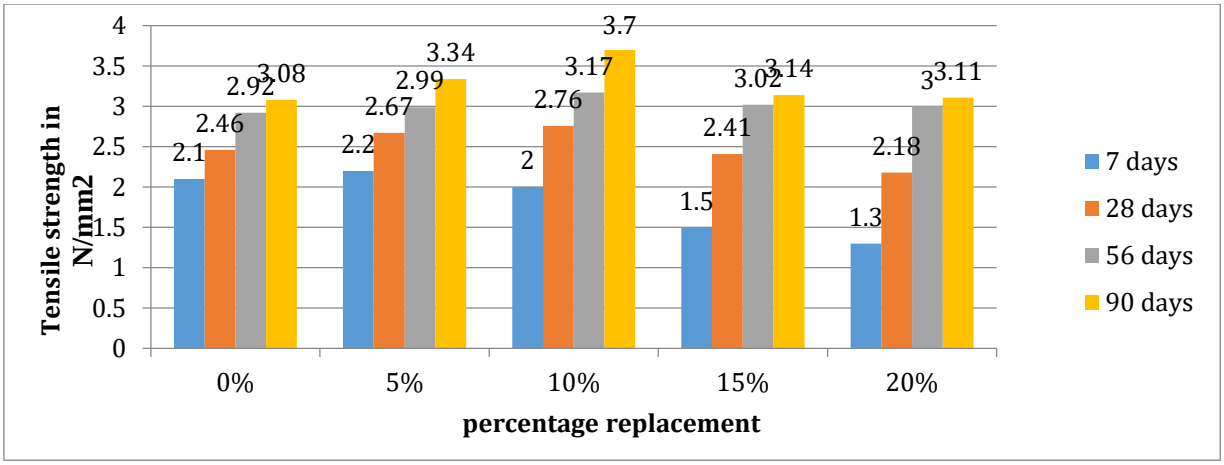

Fig 5: Flexural Strength of BLA

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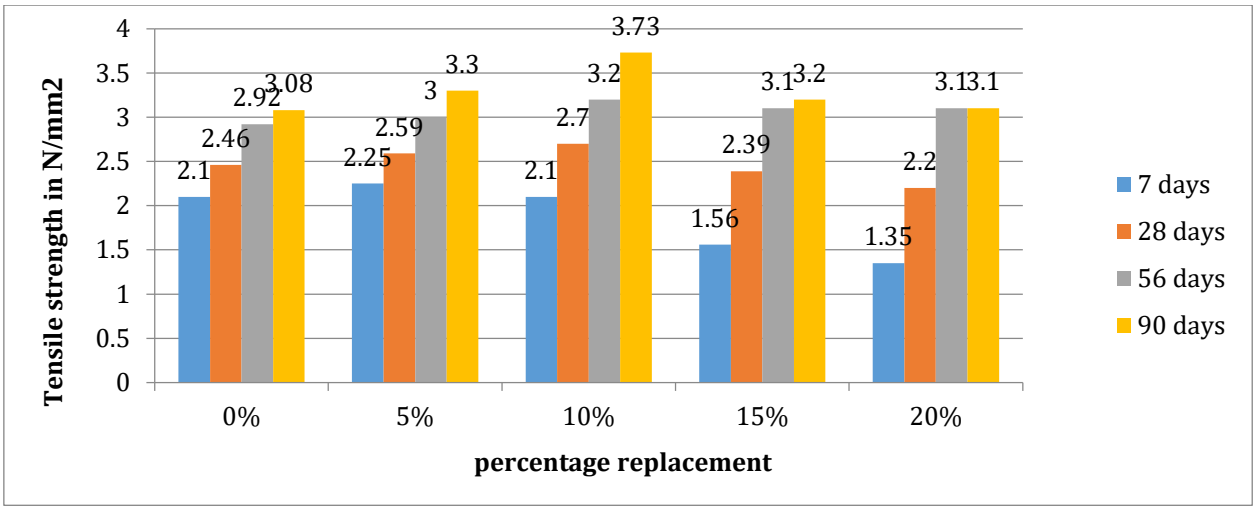

Fig 6: Flexural Strength of PLA

IV. CONCLUSION

After completion of the research work it can be conclude that

- The chemical content of BLA which consist of SiO_2, AL_2O_3, and Fe_2O_3 was found to be more than the minimum requirement of 70%.
- The chemical analysis on BLA and PLA indicated that it contained essential chemical compounds.
- BLA and PLA is a good pozzolanic material and can partially replace cement.
- The compressive strength of concrete decrease with the increase in percenr of bamboo leaf ash and pawpaw leaf ash.
- The compressive strength, split tensile strength and flexural strength of BLA and PLA concrete increased.
- The optimum level of replacement achieved at 10% BLA and PLA which yielded higher strength value in all the test conducted on hardened concrete.

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