

An Evaluation on Comparative Study of Compressive Strength of Concrete by Using Banana Fiber and Human Hairs

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Abstract: Concrete is the most useful construction material because it can be designed to withstand the toughest environments while taking on the most inspirational forms. Engineers are continually pushing the parameters to improve its performance with the help of progressive materials. The paper covers the characteristic on how to pick a material for Eco friendly concrete. It presents the possibility of the usage of by product materials like banana fiber (musa), human hairs in a concrete. Banana plant (Scientific name: *Musa acuminata*) not only harvests the delicious fruit but it also provides the textile fibre. This paper largely focuses the banana fibre based composites which have wide applications in construction. These banana fibres have good physical and mechanical properties and can be employed more effectively. Banana fibres are economical, ecological and perishable. Banana fibre reinforced concrete is high performance fibre reinforced concrete with significant behavior under tension. Banana fibres have indicated that they possess noble performance properties, are environment friendly, are less costly, and are readily obtainable, and thus, it can be utilized to improve mechanical properties of concrete. Human hair is a waste product and its disposal is concern for environment due to its non-biodegradable nature. The human hair possess similar properties to that of other synthetic fibers. The hair fiber reinforced concrete is the type of concrete the mixture of concrete with discontinuous discrete fibers which results in the tensile strength and also reduces the growth of micro cracks in the concrete. Hair fiber reinforced concrete is very effective and economical process to enhance the physical and mechanical properties of the concrete. In present study an attempt is made to review the use of HH in concrete and its properties. It is observed that hair fibers can effectively be used in concrete and it also results in improvement of mechanical properties of concrete. The detailed experimental investigation is doing to study the effect of partial replacement of cement by BF and HH in concrete. Ordinary Portland cement of grade 53 and M25 grade concrete were used. In this paper proportion form are 0%, 0.25%, 0.50%, 0.75%, 1.00% BF and HH in concrete by replacement of cement. The purpose of this research is to study the effects Of BF & HH on compressive strength and flexural strength of concrete.

Keywords: BF[Banana fiber(musa)], HH [Human Hairs], CS [compressive strength], FS[flexural strength]

I. INTRODUCTION

In construction field concrete is one of the most used creation material. Concrete has various desired properties like high stiffness, high compressive strength and high durability under usual environmental elements. As all of us know that concrete is brittle in nature and also we know that it is weak in tension. Concrete has two insufficiencies, low strain at fracture and low tensile strength. To overcome from this problem we use reinforcement in concrete.

Fiber is a small piece of reinforcing material possessing certain characteristics properties. Addition of fibers to concrete influences its behavior which significantly depend on the type and percentage of fiber. The properties of fiber reinforced concrete is influenced mainly by the physical and mechanical properties of the fiber.

1.1 Gap Finding

Not used both material banana fibers and human hairs on the same time.

Low Strength of light weight concrete

Cost Analysis

1.2 Objective

To determine the compressive strength and flexural strength of concrete by adding banana fiber and human hairs by weight of cement for different properties. The comparison is complete between banana fiber and human hairs with different percentages. To compare the compressive and flexural strength at 0%,0.25%,0.50%,0.75%,1% replacement with cement. To evaluate the workability of concrete with banana fiber and human hairs.

II. RESULT ANALYSIS

M25 Grade Compressive Strength:

Table 1: M25 Grade Compressive Strength Of Concrete By Using Banana Fiber

Sr. No	Banana Fiber	Avg. Strength (N/mm ²) 7 Days	Avg. Strength (N/mm ²) 14 Days	Avg. Strength (N/mm ²) 28 Days
1	Normal Mix	16.44	22.5	24.74
2	0.25%	16.88	22.67	25.67
3	0.50%	17.88	22.98	25.88
4	0.75%	17.55	23.55	26.75
5	1.00%	19.88	23.87	26.79

2.1 Observation

On the basis of the experimental results obtained in the laboratory, it is observed that:

- At 0.25% banana fiber is used in concrete then there is an increment in compressive strength, then we try to add 0.50%.
- At 0.50% banana fiber is used in concrete then there is an increment in compressive strength, then we try to add 0.75%..
- At 0.75% banana fiber is used in concrete then there is an increment in compressive strength, then we try to add 1.00%..
- At 1.00% banana fiber is used in concrete then there is an increment in compressive strength as compare with 0.25%, 0.50%,0.75%. Hence the strength get increases.

Banana Fiber (musa)

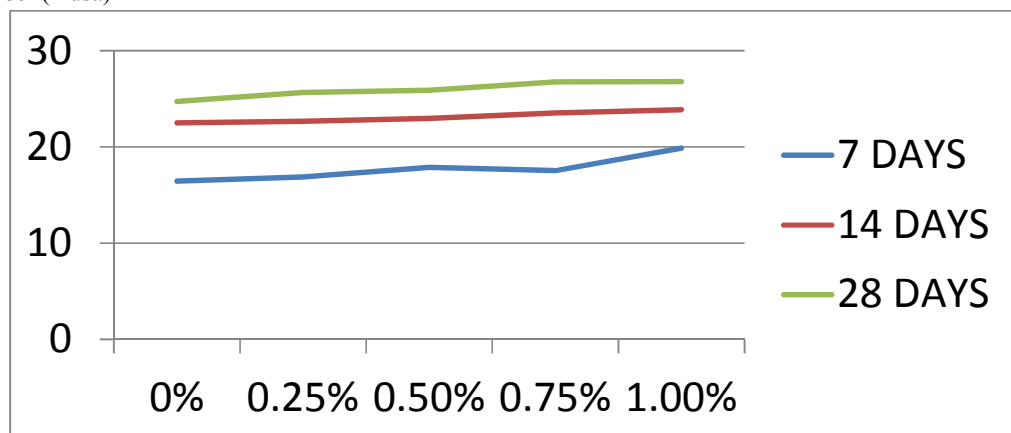


Table 2: M25 Grade Compressive Strength Of Concrete By Using Human Hairs

Sr. No	Human Hairs	Avg. Strength (N/mm ²) 7 Days	Avg. Strength (N/mm ²) 14 Days	Avg. Strength (N/mm ²) 28 Days
1	Normal Mix	16.44	22.5	24.74
2	0.25%	21.22	25.87	30.55
3	0.50%	18.92	23.68	27.98
4	0.75%	18.65	22.61	24.93
5	1.00%	17.23	22.74	24.80

Observation

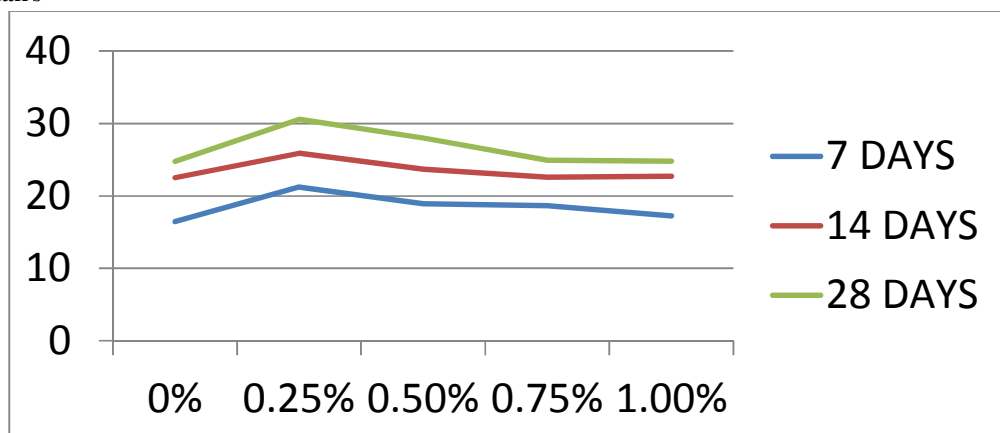
On the basis of the experimental results obtained in the laboratory, it is observed that:

- At 0.25% Human hairs is used in concrete then there is an increment in compressive strength.
- At 0.50% Human hairs is used in concrete then there is an decrement in compressive strength as compare with 0.25%.
- At 0.75% Human hairs is used in concrete then there is an decrement in compressive strength as compare with 0.25%.
- At 1.00% Human hairs is used in concrete then there is an decrement in compressive strength as compare with 0.25%, and increment in compressive strength as compare with 0.75% at 14 days and 28 days.

Human Hairs

- At 1% human hair when used in concrete then there is decrement of 10.89% in cubical compressive and 3.65% in

Human Hairs



III. CONCLUSION

- Banana fiber as a reinforcement material can considerably increase the ability to resist cracking in concrete beams.
- Flexural strength of all BF mixes containing longer fibres increasing with increasing fibre content.
- The compressive strength of concrete has increases with addition of banana fibre.
- The addition of banana fibres considerably increased the strength characteristics of concrete, mainly compressive strength and flexural strength.
- The tests shown that the strength properties of concrete improved with the addition of banana fibres to the concrete.
- The maximum increase in compressive strength is noticed when 0.25% human hairs is used in concrete compare with 0.50%, 0.75%, and 1.00% of cubes.

- It is observed that using human hairs not only increases compressive strength but also improves binding property of concrete as well as formation of micro cracks is decreases.
- It can be concluded that using higher percentages of human hairs is not possible.
- There is a remarkable increase in the concrete compressive strength after adding human hairs as a fibre also the formation of cracks even got decreases.
- The flexural strength of concrete has increases with addition of human hairs.
- Human hair is more stronger than banana fiber as compared with different percentage taken in compressive strength and flexural strength.

IV. FUTURE SCOPE

- Banana fiber and human hairs can be used with admixtures for increasing strength of concrete with partial replacement of cement.
 - Using of banana fiber and human hairs helps in reducing the environment pollution during the disposal of excess banana fiber and human hairs.
 - Using banana fiber and human hairs as replacement of cement, the Mortar mix different grades can be prepared and their results can be compared with the obtained bar chart.
 - It can also be used as a substitute to cement to improve the properties of conventional mortars and concrete.
- An alternative can be established for sand as well as cement, partially or fully with use of BF and HH in Mortar.

V. METHODOLOGY

- Collection of materials
- Properties of materials
- Preparing concrete mix
- Testing program
- Result and discussion
- Conclusion

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