

Quality Tests on Light Weight Papercrete Concrete

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Abstract: As we all are well aware about the uses of paper in day to day life, papers are being used in official as well as non official places in the form of newspapers, book papers, copy papers or other types. Mostly these papers are burned which results in environment pollution. This research deals with the usage of waste papers in concrete to check the properties of concrete by varying the percentage of papers. The papers used in this research are A4 size white papers which were thrown away in the college, the papers are of 85 gsm thickness. From the study it was found that by adding papers into the concrete the weight of the concrete decreases by certain amount while as on the other hand due to increase in the percentage of papers the strength of the concrete goes on decreasing.

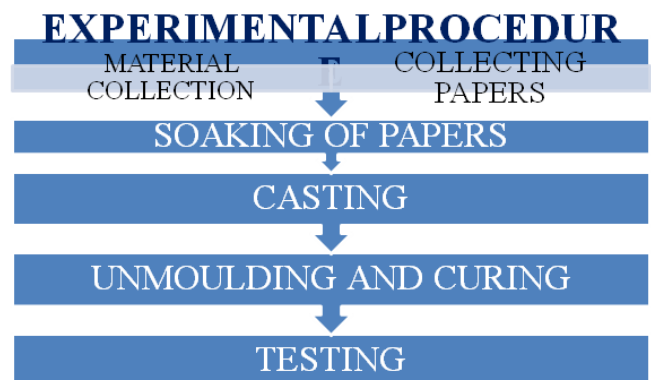
KEY WORDS: papercrete, 85gsm, light weight, A4 size white paper.

I. INTRODUCTION

Some data has been distributed on employments of papercrete, other data was found on how individuals made the material. Be that as it may, there is an absence of data on the building properties of the material. A specific blend of papercrete isn't characterized so it was hard to recognize what the structure of that blend was so as to check the outcomes. In 2006, Fuller directed an examination to decide if papercrete has reasonable mechanical and physical properties to be utilized as development material for homes [3]. The parameters that he contemplated are the Young's modulus (E), warm conductivity (K), warm obstruction (R), bond qualities, and creep conduct. The pressure versus strain diagrams recommend that papercrete is a flexible material that can continue expansive distortions. Bond assumes an essential job in the compressive quality and conduct. Examples with higher extent of bond display bigger Young's modulus. In 2006, Gallardo et al. concentrated their examination on the practicality of utilizing paper factory muck as an elective material [4]. This can be connected as an incomplete substitution of fine totals in assembling new cement planned to be utilized for minimal effort lodging venture. In view of the consequences of this investigation, they reasoned that the most appropriate blend extent is 5 to 10% substitution of paper ooze to fine totals. Any further rate substitution higher than 10% would result in a decline in both pressure and elasticity. The decrease of solid quality can be ascribed to the high water-concrete proportion and the nonattendance of silica compound in paper muck, which is basic for holding and organizing of crisp cement. Superplasticizer was just advantageous to concrete with paper plant muck as far as water and decrease thickness. In 2007, H. Yun et al.

taken a shot at mechanical properties of papercrete by taking different examples and probing them and have closed the normal compressive quality which incorporates 5% paper-concrete substitution proportion was 34 MPa and water-folio proportion scarcely influenced compressive quality of papercrete [5]. As indicated by paper substitution proportion, compressive quality influenced quickly. As indicated by them, the thickness of papercrete was diminished when the substitution proportion of waste paper of papercrete expanded. The part elasticity additionally diminished by including higher substitution proportion of waste paper. In 2008, Gunarto et al. led research facility contemplate on papercrete making papercrete board and 3D shape test with size 420×420×7 mm and 50×50×50 mm separately [1]. They took the volume proportion of paper-concrete blend as 2, 3 and 4 making in two conditions, one without admixture and the other with 0.2% sugar admixture. As per their exploration, the water ingestion was 56.93% at volume proportion of paper-concrete blend 2 with sugarcane admixture and the most noteworthy assimilation at volume proportion of paper-bond blend 4 was 84.23%. In 2011, Malthy and Jegatheeswaran directed a test ponder which examined the potential utilization of paper squander for creating a minimal effort and light-weight composite block as a structure material [2].

II. EXPERIMENTAL PROCEDURE:



The experimental procedure is clearly explained in above flow chart. The procedure is started by collecting the construction materials and waste papers which are then mixed similar to that of concrete. Before mixing of waste papers into the concrete the papers are well soaked so that the papers gets reduced into small pieces while mixing and gets uniformly distributed. The water used for soaking of papers is the same calculated amount of water which is to be used for mixing, no extra water is used. After casting the moulds are un-moulded after 24hrs and kept for curing. Which are then tested for weight, strength and water absorption test.

Revised Manuscript Received on June 05, 2019

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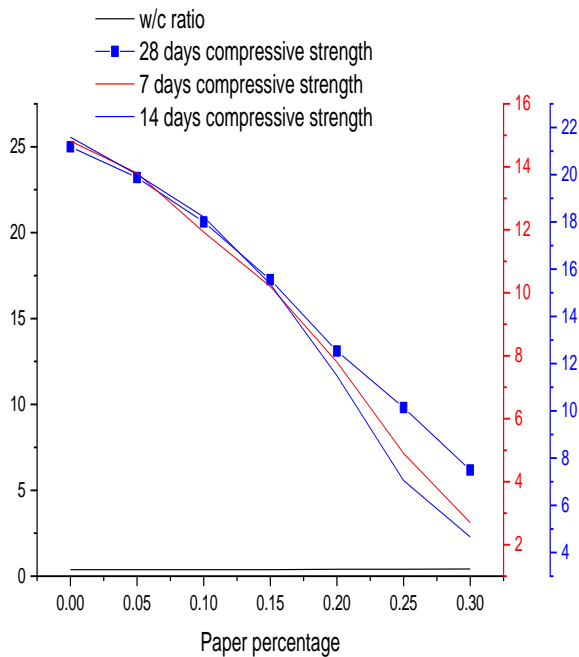
III. EXPERIMENTAL RESULTS:

The Table 1 shows the compressive strength of papercrete concrete after 7, 14 and 28 days which clearly indicate more the percentage of waste paper in concrete lesser is the strength. Table 2 shows the reduction in weight by using the waste paper in concrete.

Table three shows water percentage absorbed by the papercrete concrete after 24hrs of curing.

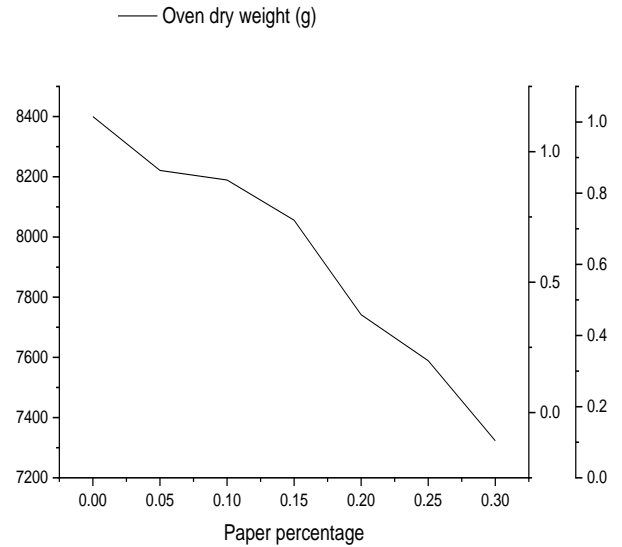
Paper percentage	w/c ratio	7 days compressive strength	14 days compressive strength	28 days compressive strength
0%	0.38	14.82	21.59	25
5%	0.38	13.80	20.01	23.21
10%	0.38	11.93	18.21	20.62
15%	0.38	10.20	15.37	17.26
20%	0.40	7.8	11.49	13.11
25%	0.40	4.9	7.05	9.82
30%	0.42	2.7	4.66	6.18

Table 1: Compressive strength of papercrete.



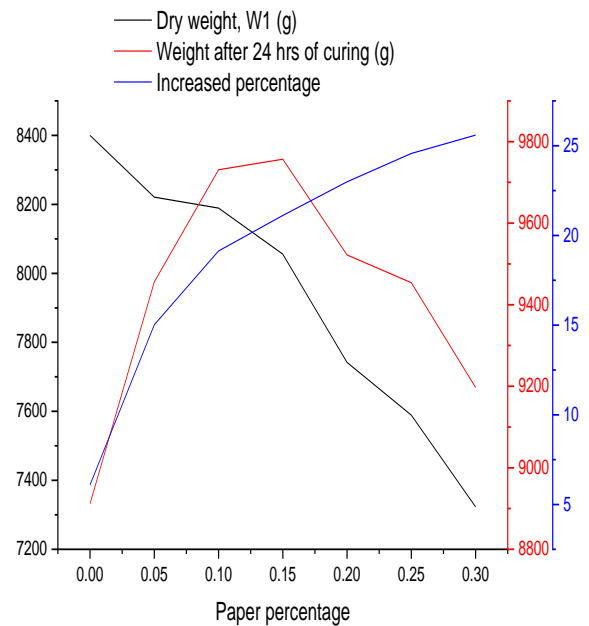
Paper percentage	Oven dry weight (g)
0%	8400
5%	8221
10%	8189
15%	8056
20%	7742
25%	7589
30%	7323

Table 2: Weight of light weight papercrete concrete.



Paper percentage	Dry weight, W1 (g)	Weight after 24 hrs of curing (g)	Increased percentage
0%	8400	8912	6.09
5%	8221	9456	15.02
10%	8189	9731	19.13
15%	8056	9757	21.11
20%	7742	9522	22.99
25%	7589	9454	24.57
30%	7323	9197	25.59

Table 3: Results for water absorption test of papercrete.



IV. CONCLUSIONS:

From this paper the following conclusions can be drawn:

- 1) Paper crete acts as a light weight concrete in which waste papers are used.
- 2) Due to increase in weight of paper to be used the overall weight of concrete goes on decreasing.
- 3) Compressive strength of paper crete goes on decreasing due to increment in weight of paper to be used.
- 4) Maximum compressive strength is when 5% paper by weight of cement is used.
- 5) More the percentage of paper is used more is the water absorption.
- 6) 25% of water is absorbed by total weight when 30% of waste paper is used, hence it is better to use restricted percentage of paper for good strength and better quality.

REFERENCES:

1. Gunarto A, Satyarno I, Tjokrodimaljo K. *Newsprint Paper Waste Exploiting for Papercrete Panel*. Institute of Research Center, Gadjah Mada University. 2008.
2. Malthy R, Jegatheeswaran D. Comparative study on papercrete bricks with conventional bricks. *JCI Journal*. January–March 2011.
3. Fuller B, Fafitis A, Santamaria. Structural properties of a new material made of waste paper. *Building Integrated Solution*, ASCE. 2006.
4. Gallardo RS, Adajar MA. Structural performance of concrete with paper sludge as fine aggregates partial replacement enhanced with admixtures. *Symposium on Infrastructure Development and the Environment*. 2006.
5. Yun H, Jung H, Choi C. Mechanical properties of papercrete containing waste paper. Architectural Institute of Korea. *18 TH International Conference on Composite Materials*. 2007.
6. Titzman LC. *Analysis of low cost building material for the mix also process. Dissertation*. Texas A & M University. 2006.
7. Mohammed BS. Papercrete as infill materials for composite wall system. *European Journal of Scientific Research*. 2009; 34(4): 455p.