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Study on Structural Behavior of Glass Powder in Concrete

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Abstract: Concrete is one of the important construction material used in the world of all engineering works including the infrastructure development proved that it is a cheap material and its constituents are widely available in nature. Due to widespread usage and exciting infrastructure development in all over the world, there is the shortage of cement. These materials are available with the high cost, to prevent this cement can be replaced with waste materials. In this project work, the properties and structural behavior of glass powder with various percentages are discussed.

Key words: Glass powder, structural behaviour, concrete, materials, development, nature

INTRODUCTION

In concrete to increase the strength of concrete by using glass powder. Glass powder is a heat resistant material. Thus, it prevents the formation of cracks. With the growth in construction activities, there is the heavy demand on concrete and consequently on its ingredient like aggregate. Effect of using glass powder in concrete and the utilisation of waste glass powder in concrete is illustrated by Raju and Kumar (2014), Shekhawat and Aggarwal (2014). However, our objective of the project is to study and compare the strength behavior of concrete using glass powder as a partial replacement of fine aggregate. The particular strength of glass powder specific and conventional concrete. To carry out the comparative study of glass powder specific and traditional concrete strength.

We studied effect of lignite fly ash and composted coir pith on cultivable soils utilization of glass powder as a partial replacement of cement and its effect on concrete strength is determined by Elavalagan (2014), experimental study on concrete using cement with glass powder. Effect of lignite fly ash and composted coir pith on cultivable soils illustrated by Subramani and Ram (2015), also this study detailed in degrading potential of immobilized laccase from endophytic fungi of coastal sand dune plants (Bhardwaj, 2013) and quality management. The key to basic safety and reliability of prototype fast breeder reactor (Table 1 and 2).

Table 1: Chemical properties of glass powder

Description	Glass powder
Sulphur trioxide	72.6
Potassium oxide	0.45
Sodium oxide	0.23
Magnesium oxide	9.65
Calcium oxide	3.27
Iron oxide	13.66
Alumina	0.1
Silica	-
Fineness passing (45 μm)%	80
Unit weight (kg/m^3)	2578
S.gravity	2.56

Table 2: Physical property of glass powder

Description	Vslues
S. gravity	2.56
Fineness (150 μm)	99.45
Fineness (90 μm)	98.01
pH value	10.28
Color	Grayish white

MATERIALS AND METHODS

The different diaries were gathered and examined on the fractional substitution of the coarse total by various materials. As per these diaries the procedure of the trial and the strategy for the experimentation and the diverse tests led in those diaries were examined and learned. On the premise of the investigations of the diaries gathered for the test the exploratory procedure for the venture was pick.

As indicated by the strategy taken after for the venture, the materials were gathered for the test, the preparatory tests were led to the materials to know the properties, for example, particular gravity, fineness modulus and the water retention. In view of these

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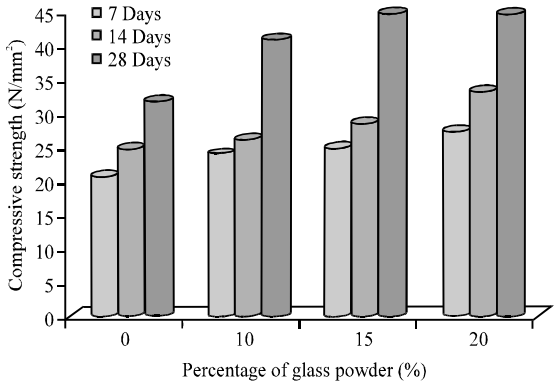

Fig. 1: Compressive strength of cubes

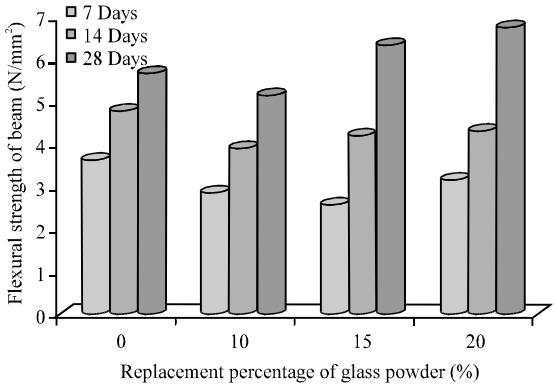

Fig. 2: Flexural strength for beams

Table 3: Test results compressive strength for cubes

	Compressive strength (N/mm²)			
		Glass powder concrete (%)		
Number of curing days	Plain concrete	10	15	20
7	21.05	24.44	24.78	26.55
14	25.33	26.22	27.32	31.99
28	32.57	41.02	42.30	43.66

Table 4: Test results flexural strength for beams

	Flexural strength (N/mm²)			
		Glass powder concrete		
Curing days	Control concrete	10	15	20
7	3.46	2.87	2.58	3.50
14	4.28	3.92	4.23	4.25
28	5.86	5.16	6.33	6.77

properties the outline blend was done to know the amount of the materials required for the M25 Grade concrete.

The examples with the three distinct rates of the fractional substitution of fine total by artistic waste, for example, 7, 11 and 14% alongside the control examples. The compressive, split and flexural quality of the examples was tried (Fig. 1 and Table 3 and 4).

RESULTS AND DISCUSSION

The different percentage of glass powder in concrete has the following conclusion. The 20% achieves the maximum flexural strength for partial replacement of cement with glass powder is found to be greater than the conventional concrete. It made maximum compressive strength when there is the partial replacement of cement with glass powder (20%). So, the maximum percentage of replacement of glass powder is 20% (Table 3 and 4) (Fig. 1 and 2).

CONCLUSION

Cements have increment strength execution. Subsequently, the substitution of customary sand by clay sand is a decent choice on the grounds that does not infer quality misfortune and has prevalent toughness execution. With respect to the substitution of customary coarse totals by clay coarse totals, the outcomes are extremely encouraging, however, failed to meet expectations in water retention under vacuum test. These cements have a decent conduct particularly concerning narrow water retention. Utilizing earthenware squanders in cement can take care of a few natural issues by one hand maintaining a strategic distance from the extraction of substantial amounts of crude materials from the earth and furthermore, decreasing GHG outflows created in the clinker generation and by another lessening the landfill zones that generally would be possessed by this squanders.

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