

TO STUDY THE EFFECT OF GLASS POWDER IN CONCRETE STRUCTURE

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ABSTRACT:

This investigation was useful to search how to utilize glass powder in concrete structure. We performed various test on concrete such as, slump cone test, compressive strength test as well as flexural test also. The workability of concrete is determined by using slump cone test after that we find out average compressive strength of concrete. For each type of concrete, a total three cubes (150mm x 150mm x 150mm) were casted. The cubes were tested after 7days, 14days and 28 days curing for study the development of compressive strength, during casting we replaced glass powder from 5% to 25% of cement in concrete then we determine average Flexural strength of concrete. For each type of concrete, a total three beams (150mm x 150mm x 700mm) were casted.

KEYWORDS: crushed glass powder, Slump cone test, Compressive strength, Flexural strength.

INTRODUCTION:

Cement is the very important material in world construction. We used cement for preparation concrete materials, Concrete play very important role in world construction due to its strength, durability and economy. our all ready mix concrete plant approximately 7.20 million meter cube concrete provided for one year in throughout India and its application are national highway, state highway, bridges canal streets,, high-rise buildings, Dam etc. As we know today, most of foreign developing country facing shortage of post consumers

disposal waste site and it's become very difficult problems. For this reason we need to reusing waste product for production new material and to keep maintain environmental pollutions. Normally glass manufacturing company collected waste glass from market and from waste glass prepare new glass material such as bottle showpiece day to day life daily uses materials etc. and some amount from the waste glass collected is that can be used towards the production of new glass.

EXPERIMENTAL PROGRAMME:

TEST ON WORKABILITY OF CONCRETE:

slump test is the most commonly used methods for measuring the Workability of concrete which can be employed either in laboratory or at the work site it is not suitable methods for very wet or very dry concrete as per according to IS: 1199-1959.

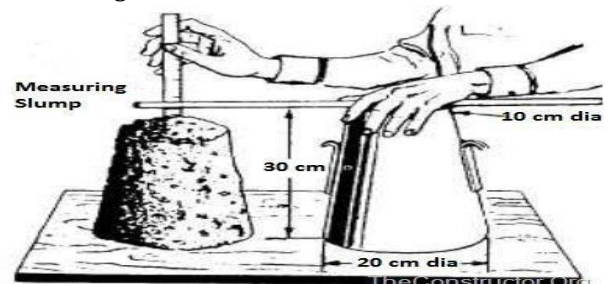


Fig 1 Slump cone of Concrete

TEST ON COMPRESSIVE STRENGTH OF CONCRETE:

According to IS 516-1959, determining compressive strength of concrete. The specimens of size is 150mmX150mmX150mm. (According to IS: 10086-

1982) the cube casted for 7 days, 14 days and 28 days and immersed in water, we add 0%GP ,5%GP, 10%GP, 15%GP ,20%GP and 25%GP respectively, as partly replacement of cement.



Fig 2 Compressive strength of concrete

TEST ON FLEXURAL STRENGTH OF CONCRETE

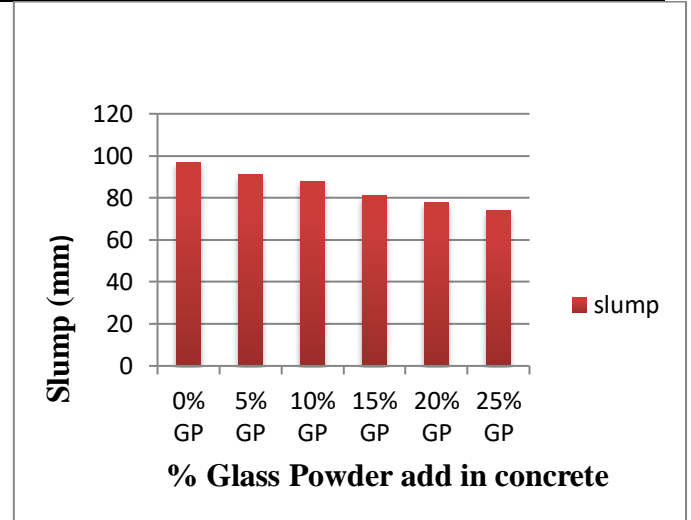
According to IS 516-1959, determining the Flexural strength of concrete. The specimens of size are 150mm X150mm X700mm. The beam casted for 7 days, 14 days and 28 days and immersed in water, we add 0%GP ,5%GP, 10%GP, 15%GP ,20%GP and 25%GP respectively, as partly replacement of cement.



Fig 3 Flexural strength of concrete

Table 1 Slump cone test of concrete

Mix Designation	Percentage replacement of cement by glass powder (%)	Slump (mm)	Percentage increase or decrease with respect to reference mix (mm)
M1	0	97	0
M2	5	91	-6
M3	10	88	-9
M4	15	81	-16
M5	20	78	-19
M6	25	74	-23

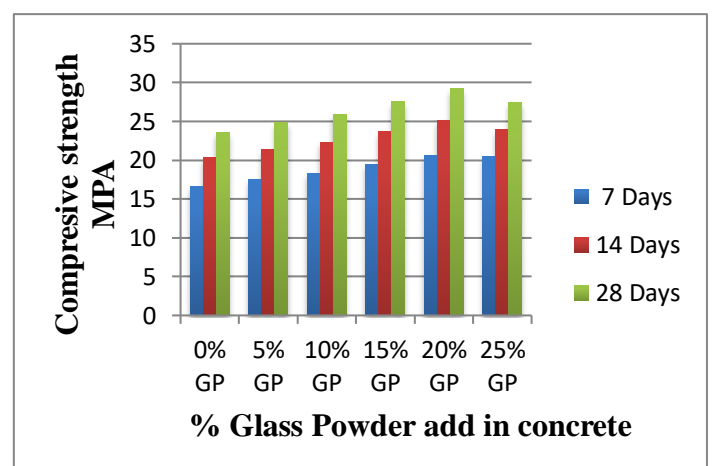


Graph 1 slump cone of concrete of adding GP in concrete

DISCUSSION: From table 5.1 and graph 5.1 we can conclude that workability of concrete decreases when gradually as the glass content increases.

Table 2 Compressive strength of concrete

Overall results of development of Compressive strength in concrete with age						
No of days for curing	Compressive strength, Mpa					
	0% GP	5% GP	10% GP	15% GP	20% GP	25% GP
7 Days	16.63	17.56	18.3	19.46	20.63	20.42
14 Days	20.29	21.42	22.32	23.74	25.15	23.93
28 Days	23.6	24.85	25.89	27.54	29.18	27.45



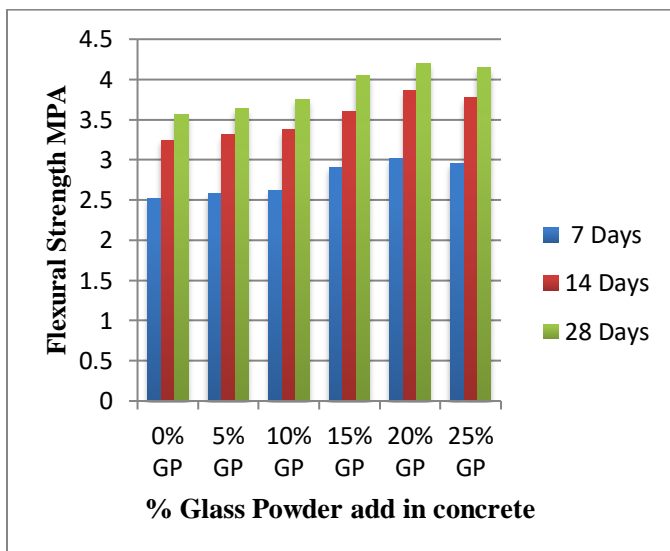
Graph 2 Compressive strength of concrete of adding GP in concrete

DISCUSSION: The table gives the results of test conducted on hardened concrete with 0-25% glass powder for 7, 14 and 28 days. From table 5.2 and figure 2, the result shows that the compressive strength

increases with increasing curing time. It seems the compressive strength of concrete increase gradually from 0%-20% replacement by glass powder ,we found maximum compressive strength at 20% replacement of glass powder beyond that at 25% strength reduced

Table 3 flexural strength of concrete

Overall results of development of flexural strength in concrete with age						
No of days for curing	Flexural strength, Mpa					
	0% GP	5% GP	10% GP	15% GP	20% GP	25% GP
7 Days	2.52	2.58	2.62	2.91	3.02	2.95
14 Days	3.24	3.31	3.375	3.6	3.86	3.77
28 Days	3.56	3.64	3.75	4.05	4.2	4.15



Graph 3 Flexural strength of concrete of adding GP in concrete

DISCUSSION: The table gives the results of Flexural strength of concrete with 0-25% glass powder added for 7, 14 and 28 days. From table 5.3 and Graph 5.3, we conclude that the Flexural strength increases with increasing curing time. It seems the Flexural strength of concrete increase gradually from 0%-20% replacement by glass powder, we found maximum Flexural strength at 20% replacement of glass powder beyond that at 25% Flexural strength reduced.

CONCLUSIONS:

On the basis of the result obtained during experimental investigation following conclusion were drawn,

- 1) If we found increases percentages of glass powder in concrete then flexural strength also increases up to 20% beyond that it will be decreases.

- 2) Concrete compressive strength, tensile strength, absorption, voids ratio and density are improved as a result of using 20.0% glass powder cement replacement.
- 3) If we increase percentages of glass powder in concrete then compressive strength also increases up to 20% beyond that it will be decreases.
- 4) If we increases percentages of glass powder in concrete then decrees workability of concrete .if we use superplasticizer was found to necessary maintain water cement ratio.
- 5) Setting time and soundness of glass powder Portland cement is similar to without mixed glass powder in Portland cement.

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