

OPTIMUM PROPORTION OF BAGASSE ASH -GEOPOLYMER COMPOSITION AS A PARTIAL REPLACEMENT OF FINE AGGREGATE

Vivek mishra¹

Civil Engineering, Veerayatan Group of institution mandvi, kachchh, vivekvmishra19@gmail.com

Abstract

Research carried out in past suggest improvement in compressive strength by replacement of bagasse ash and geopolymers. From the sugar factory by-product in the form of bagasse ash as available in the form of pozzolanic material tactically at throw away prices. If not dealt with properly it increases pollution and related health hazards and may disturbed the ecological balance. If it can be used to replace the cement not only above issues can be tackled but it will also help to reduce the cost of concrete. So as to find optimum bagasse ash content as a replacement of cement. Various percentage like 5%,10%,15%,20% by weight of cement were used for the chosen grade of concrete M20,M25,M30. Cube are casted and tested to find strength at the age of 3,7,28 days of concrete using normal curing procedure that is ponding. The variation of various grades of concrete are shown in figures shown below. The fig:-1 indicates that 5% bagasse ash use to replace cement gets the maximum compressive strength at 3 days of curing after that as the bagasse ash percent increases the strength reduces very fast.

Keywords- Concrete; Bagasse ash; Geopolymer; optimum; Partial Replacement.

I. INTRODUCTION

Cement which is key ingredient of concrete which plays a great role, but it is the most expensive and not eco-friendly material.

From the sugar factory by-product in the form of bagasse ash as available in the form of pozzolanic material tactically at throw away prices.

If not dealt with properly it increases pollution and related health hazards and may distribute the ecological balance.

Geopolymer is by-product of construction industry is easily available in city at free of cost. Geopolymer source material:-Fly ash, Slag, Rice-husk ash, Red mud, Volcanic deposits, broken-down masonry, Glass industry waste, ceramic waste etc.

The variation of various grades of concrete are shown in fig:-2 uses similar trend is observed in seven days also for M20,M25,M30 only for M30, unlike that of M20,M25 as above.

For grade M30, there is a continuously drop observed in the strength as % of basis increased.

II. OBJECTIVE OF WORK

To design mixes of various grades.
 To decide optimum bagasse ash and geopolymers content.
 To cast and test concrete using various bagasse ash and geopolymers percentage.
 Assess improvement in following properties

- Compressive strength

- Split tensile strength
- Flexural strength

Decide optimum bagasse and geopolymers percentage

III. SCOPE OF WORK

Based upon the quantities of ingredient of the mixes, the quantities of Sugar cane Bagasse ash to replace cement by 5%,10%,15% to 20% by weight of cement.

Geopolymer added to replace sand by 10%, 20%, 30% to 40%.

IV. LITERATURE REVIEW

It is found that the cement could be advantageously replaced with SCBA up to maximum limit of 10%. Although, the optimal level of SCBA content was achieved with 1.0% replacement.

10% to 20% can be effectively replaced with a Bagasse ash.

The compressive strength of the Geopolymer Concrete increases with increase in the curing time.

V. RESULT

% BA		0	5	10	15	20
DAY	M 20	13.4	18	14.5	4.17	3.37
	M 25	17.72	19	13	4.78	3.27
	M 30	18.69	21	11.3	4.81	2.59
DAY	M 20	17.87	24	17.8	7.52	6.35
	M 25	19.6	21	13.6	6.39	4.38
	M 30	20.11	18	14.8	6.76	3.03

Table :- 1

% GP		0	10	20	30	40
3 DAYS	M 20	13.4	17	12.8	9.7	5.3
	M 25	17.72	19	13.7	9.88	3.9
	M 30	18.69	21	16.7	9.36	4.09
7 DAYS	M 20	17.87	18	12	9.67	5.98
	M 25	19.6	17	14.6	12.6	6.64
	M 30	20.11	21	14.2	10.4	5.76

Table-: 2

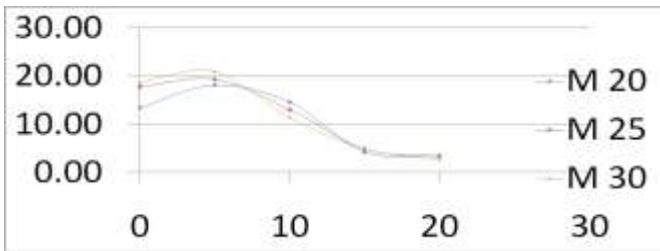


Figure-:1 Compressive Strength of Bagasse Ash 3 Day

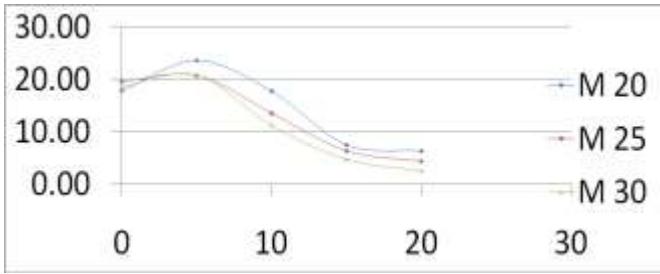


Figure-:2 Compressive Strength of Bagasse Ash 7 Day

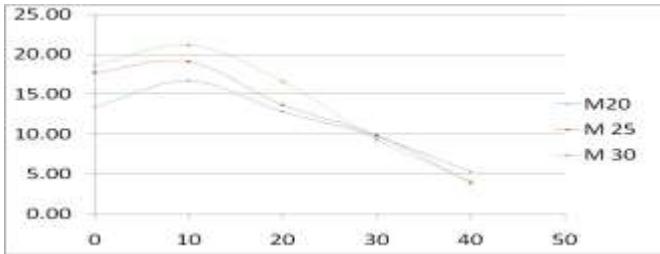


Figure-:3 Compressive Strength of Geopolymer 3 Day

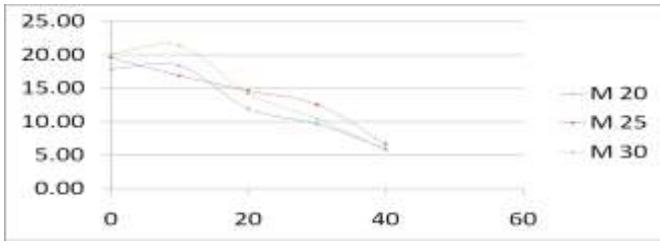


Figure-:4 Compressive Strength of Geopolymer 7 Day

VI. DISCUSSION OF RESULT

Various percentage like 5%,10%,15%,20% by wt of cement were used for the chosen grade of concrete M20,M25,M30.

Cube are casted and tested to find strength at the age of 3,7,28 days of concrete using normal curing procedure that is ponding.

The variation of various grades of concrete as shown in Figure

Similar trend is observed in seven days also for M20,M25,M30 only for M30, unlike that of M20,M25.

For grade M30, there is a continuously drop observed in the strength as percent of basis increased.

For geopolymer various percentage like 10%,20%,30%,40% by weight of sand were used for the chosen grade of concrete M20,M25,M30

REFERENCES

- [1] Abdolkarim Abbasi and Amin Zargar " Using Bagasse Ash in Concrete as Pozzolan" Middle-East Journal of Scientific Research 13 (6): pg.716-719, 2013
- [2] Prakash R.Vora, Urmil V. Dave "Parametric Studies on Compressive Strength of Geopolymer Concrete" Chemical, Civil and Mechanical Engineering Tracks of 3rd Nirma University International conference on Engineering (NUiCONE-2012)
- [3] R. Srinivasan ,K Sathiya "Experimental Study on Bagasse Ash in Concrete" International Journal of Service Learning in Engineering Vol. 5, No. 2, pg. 60-66, 2010.

