iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** I **Month of publication:** January 2018

DOI: http://doi.org/10.22214/ijraset.2018.1331

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor :6.887
Volume 6 Issue I, January 2018- Available at www.ijraset.com

Study on Strength Development of Geo-Polymer Concrete

Sudhakar G N[1],
[1]*Department of Civil Engineering New Horizon College of Engineering*

Abstract: ***Geo Polymer concrete is a green concrete better than OPC based concrete as the carbon di oxide emission is low compared to OPC. An attempt is made to understand strength properties of Geo Polymer concrete in this research.***
Keyword: **S *GGBS, NaOH***

I. INTRODUCTION

Geo-Polymer concrete has a lot of variables in its design. The attempt is to link few of the variables to get the desired strength

II. MATERIALS

Following materials have been used in the preparation of GPC

A. Fly Ash
B. GGBS
C. Sodium Hydroxide
D. Sodium Silicate
E. Water
F. Fine Aggregates
G. Coarse Aggregates

The following ratios were used for mix design

SL.NO	Design parameters	VALUE	UNIT
1	The wet density of GPC	2400	Kg/m^3
2	Ratio of sodium silicate to Sodium Hydroxide	2.5	Constant
3	The water content Chosen for Mix	120	Liters
4	The water content in sodium silicate	30	Percentage
5	FA percentage	16	Percentage
6	GGBS percentage	4-20% of binder	Percentage
7	Corse aggregate percentage	56	Percentage
8	Fine aggregate percentage	44	Percentage
9	Molarity consider for solution	8&16	Molarity

Figure 1 Mixed GPC

©IJRASET (UGC Approved Journal): All Rights are Reserved

III.RESULTS AND DISCUSSION

The following results were obtained after testing Cylinders samples at the 28day age.

DIA	8M	16M
75mm dia	34.46	23.23
100mm dia	37.98	26.1
150mm dia	42.04	36.44

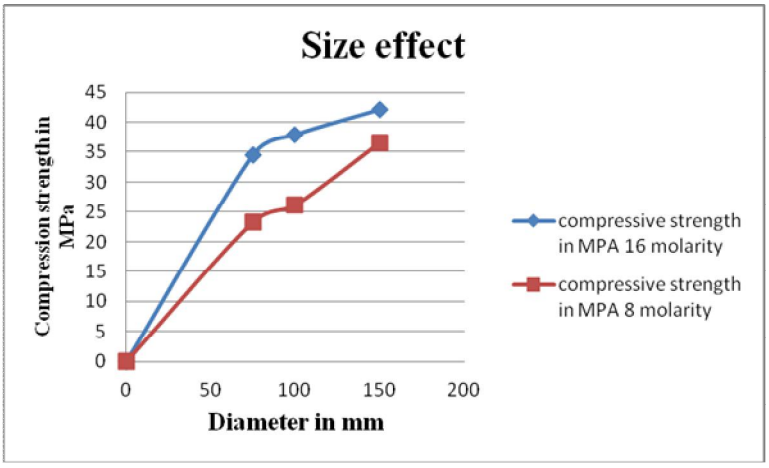


Figure 2 Graph of size vs strength

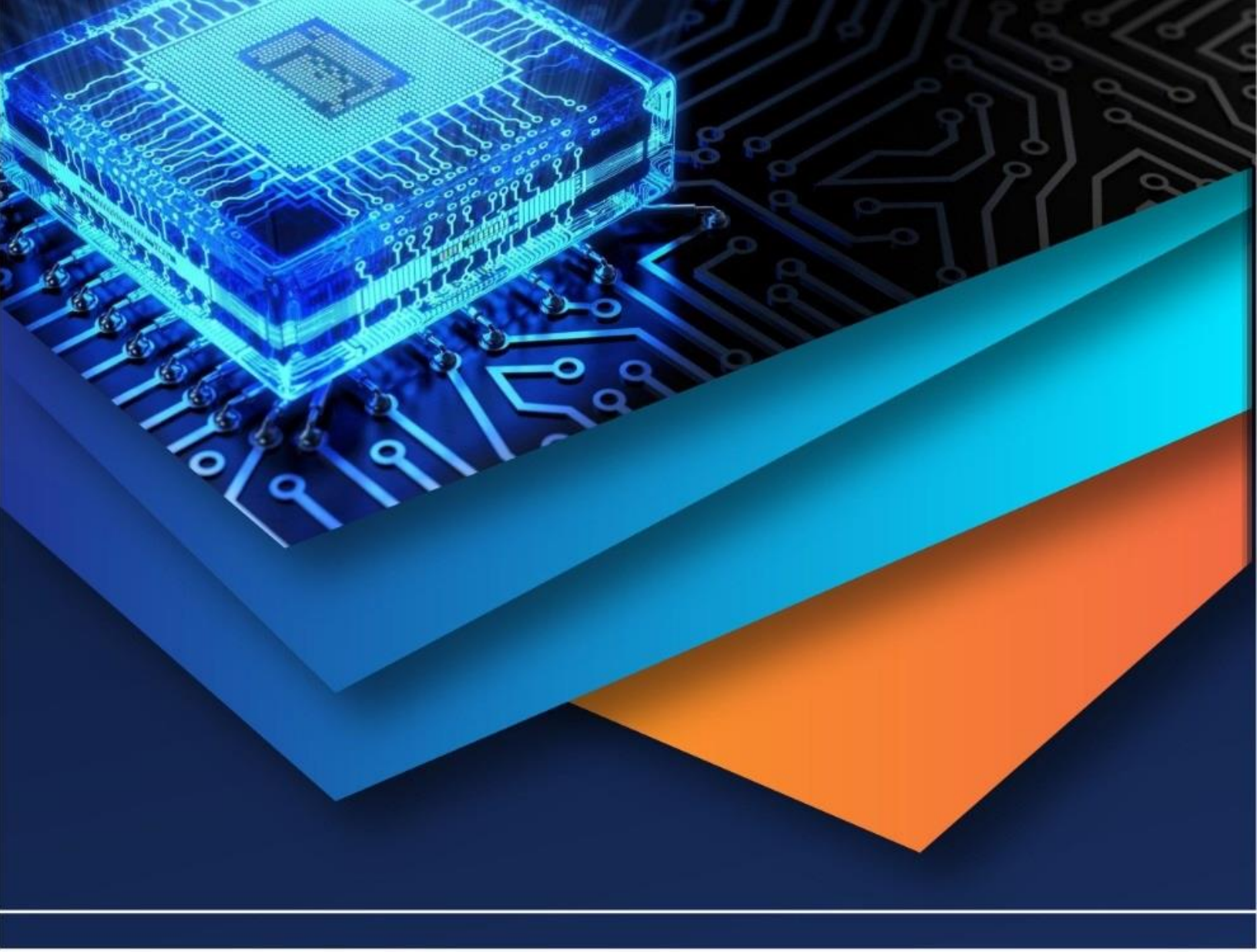
IV.CONCLUSIONS

It was observed that increase in molarity increased the strength of specimens. Reduction in size of specimens decreased the strength irrespective of molarity.

REFERENCES

[1] Davidovits, J. "Soft mineralogy and geopolymers"", Proceedings of theGeopolymer 88 International Conference, the Université de Technologie,Compiègne, France (1998).
[2] Wallah, S. E. and Rangan, B.V., "Low Calcium Fly Ash Based Geopolymer Concrete: Long Term Properties." Research Report GC2, Faculty of Engineering, Curtin University of Technology, 2006
[3] Panias D, Giannopoulou IP, Perraki T. Effect of synthesis parameters on the mechanical properties of fly ash-based geopolymers. Colloids Surf A 2007;301:246–54.
[4] J G S van Jaarsveld, J S J van Deventer, G C Lukey. The Effect of Composition and Temperature on the Properties of Fly Ash- and Kaolinite-based Geopolymers[J]. Chemical Engineering Journal, 2002, 89: 63-73
[5] Vijai K., Kumutha R. and Vishnuram B. G. (2010). Effect of types of curing on strength of geopolymer concrete. International Journal of the Physical Sciences, 5(9), 1419-1423
[6] Benny Joseph and George Mathew," Influence of aggregate content on the behavior of fly ash based geopolymer concrete" ,Scientia Iranica A (2012) 19 (5), 1188–1194
[7] Davidovits J (1991). Geopolymers: Inorganic Polymeric New Materials. J. Thermal Anal. 37: 1633-1656
[8] Hardjito D, Wallah S, Sumajouw DMJ and Rangan BV (2004) On the development of fly ash–based geopolymer Concrete. ACI. Mater. J, 101 (6), 467–472.
[9] Kiatsuda Somna,Chai Jaturapitakkul,Puangrat Kajitvichyanukul and Prinya Chindaprasirt "NaOH-activated ground fly ash geopolymer cured at ambient temperature", Fuel 90 (2011) 2118–2124
[10] M.A.M. Ariffin, M.A.R. Bhutta, M.W. Hussin,M. Mohd Tahir and Nor Aziah "Sulfuric acid resistance of blended ash geopolymer concrete", Construction and Building Materials 43 (2013) 80–86
[11] Prakash R. Vora and Urmil V. Dave "Parametric Studies on Compressive Strength of Geopolymer Concrete", Procedia Engineering 51 (2013) 210 – 219
[12] Xie Z, Xi Y. Hardening mechanisms of an alkaline-activated class F fly ash. Cem Concr Res 2001;31(9):1245–9.
[13] Puertas F, Palacios M, Gil-Maroto a, Vázquez T. Alkali–aggregate behaviour of alkali-activated slag mortars: effect of aggregate type. Cement Concr Compos 2009;31(5):277–84.
[14] PAWAN KUMAR K R, SURENDRA B V Study on strength of geopolymer concrete with ambient temperature curing and low alkali content IRJET, Page 1073, Volume 3 Issue 05 may 2016.

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)