



EFFECTS OF FIBRES ON MECHANICAL PROPERTIES OF GEOPOLYMER CONCRETE

**Amar Kalyane, Abhijeet Bankar, Amul Dewasi, Shreyas Mehta,
Aakash Kulkarni**

ABSTRACT

Geopolymer concrete is the name given to concrete where the binder is entirely replaced by an inorganic polymer formed between a strong alkaline solution and an aluminosilicate source. The ratio and quantity of alkaline solution used can affect-amongst other factors – the concrete strength and curing time. Aluminosilicate sources are not limited to red-mud, fly-ash, blast furnace slag and kaolin. The variability of geopolymer binders and activators increase the difficulty of manufacturing a homogenous and universal geopolymer concrete standard. Currently, geopolymer concrete exhibits as good as, and in some areas superior engineering properties to normal concrete.

Keywords: *Geopolymer concrete, Fly ash, Fibres*

I. INTRODUCTION

Geopolymer is essentially cement free concrete. This material is being studied extensively and shows promise as a greener substitute for ordinary Portland cement concrete in some applications. Research is shifting from the chemistry domain to engineering applications and commercial production of geopolymer.

What is Geopolymer Concrete?

Geopolymer concrete is a high strength and lightweight inorganic polymer that can be used in place of normal concrete. The main difference between normal concrete and geopolymer concrete is that normal concrete uses ordinary Portland cement (OPC) as a binder whereas geopolymer concrete uses a chemical and fly ash mixture as a binder

II. HEADINGS

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LIST OF SYMBOLS AND FIGURES

LL :	Liquid Limit
PL :	Plastic Limit
PI :	Plasticity Index
SI :	Shrinkage Index
SL :	Shrinkage Limit
IS :	Indian Standard

LIST OF FIGURES



Fibres



Steam Curing



Fly Ash\



Compression Machine

1. Geopolymer Concrete – Mix Proportion
2. Methodology

**1. Geopolymer Concrete (Mix Proportion)**

Sr. No.	Material	Quantity (kg/m ³)
1	Coarse Aggregates	1008
2	Fine Aggregates	840
3	Fly Ash	408
4	8M NaOH solution	41
5	Sodium Silicate solution	103
6	Extra water	4.33
7	Super-Plasticizer	8.16

2. Methodology :

For casting of the geopolymer concrete samples, we had to prepare a design mix based upon the empirical charts and data provided by the past researchers. The process of manufacturing and curing was also adopted after consulting some geopolymer concrete experts.

V. CONCLUSION

The process of geopolymerization is quite faster than the hydration of cement concrete and almost total design strength of the mix is achieved in 7 days after which the gain in strength is insignificant.

Limitations of Geopolymer Concrete

The ineffectiveness of commercially available chemical admixtures to change the fresh concrete properties, such as water content, viscosity, cohesion and setting time are the major limitations of geopolymer concrete.

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AUTHOR

Amar Kalyane is currently working as assistant professor in PVPIT college Pune, completed his Mtech in geotechnical engineering in Basaveshwar Engineering College Bagalkot and also has academic experience of 3.6years.

C0-AUTHORS

Abhijeet Bankar, Amul Dewasi, Shreyas Mehta, Aakash Kulkarni are students of PVPIT college Pune, pursuing their final year degree.