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## “EXPERIMENTAL STUDY OF THE STRENGTH PARAMETERS OF FLY ASH GEOPOLYMER CONCRETE AND CONVENTIONAL CONCRETE”

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**ABSTRACT:** Ordinary cement is the most flexible, study and dependable development on the world. To discharges of the enormous measure of the carbon dioxide to the climate. Geopolymer concrete is the eco-accommodating development materials for limiting discharges of carbon dioxide. Use of different ventures side-effect like fly ash, ground Granulated impact heater slag (GGBS), rice husks debris and so on the extraordinary issue to removal the strong waste from the nuclear energy station. Around 120 million tons fly debris produce from nuclear energy station in India. Geopolymer concrete has high compressive strength, higher imperviousness to fire, low shrinkage and better warm protection properties and so on.

**KEY WORD:** Geopolymer concrete, fly ash, sodium silicate, sodium hydroxide, alkaline activator.

### 1. INTRODUCTION

Concrete is perhaps the most principal material utilized in the field of structural designing. concrete. Concrete is the world most versatile, durable and reliable construction material. Large quantities of portland cement are required for concrete. The consumption of ordinary portland cement causes pollution to environment due to emission of CO<sub>2</sub>. Geopolymer concrete was introduced to reduce environment pollution that causes by production of Portland cement. Geopolymer concrete is a high strength and light weight inorganic polymer that can be used in place of normal concrete. It is made by mixing different combinations of cementing materials such as silica fume, rice husk ash, metakaolin, Ground granulated blast furnace slag(GGBS) and Fly ash along with fine aggregate, coarse aggregates and alkaline solution, Sodium hydroxide and sodium silicate are generally used. To produce eco friendly concrete the cement is replaced with fly ash, GGBS, etc. Sodium silicate(Na<sub>2</sub>SiO<sub>3</sub>) are usually used as a alkaline activators in geopolymerization process and alkaline liquid are being used to replaced the portland cement to produced geopolymer concrete. The alkaline liquid tha been usedis the combination of sodium hydroxide(NaOH) and Na<sub>2</sub>SiO<sub>3</sub>. Concentration of sodium hydroxide is the most important factor for geopolymer synthesis. The use of higher concentration of sodium hydroxide yield higher .compressive strength of geopolymer concrete.

### 2. METHODOLOGY

**BATCHING :** The process of measuring ingredient or material to prepare concrete mix is known as batching of concrete. Batching can be done by two method volume batching and weight batching. Batching should be done properly to get quality concrete mix.

**MIXING:** Mixing concrete is defined as “complete blending of the material which are required for the production of a homogeneous concrete. Mixing time of concrete mixer is kept as 2 min.

- During the process of mixing great care is to be taken insured that the material are maintained in a uniform condition.

- There are two different types of concrete mixing.

1. Manual mixing (Hand Mixing)

2. Mechanical mixing (machine mixing)

**COMPACTION:** Compaction is the process to remove air voids from concrete mixture to produced the dense and compacted concrete.

**TYPES OF COMPACTION:**

- i) Hand compaction: Hand compaction concrete is adopted in case of unimportant concrete work. The thickness of layer of concrete is limited about 15.20cm . Hand compaction is done by tamping.
- ii) Compacting by vibration : Compacting by hand if properly carried out on concrete with sufficient workability. Gives satisfactory result but strength of hand compacted concrete will be low because higher water / cement ratio required for full compaction is best done by vibration. Following types of vibration are used :
  1. Internal vibration: Needle vibration.
  2. External vibration : Vibrating table.

**CURING** :The operation of maintaining humidity and tempreture of fresh placed concrete during some definite period to assure the proper hardening of geopolymer concrete.

**GRADE OF CONCRETE : M20**

**TESTING OF CUBE AND BEAM OF CONVENTIONAL CONCRETE**

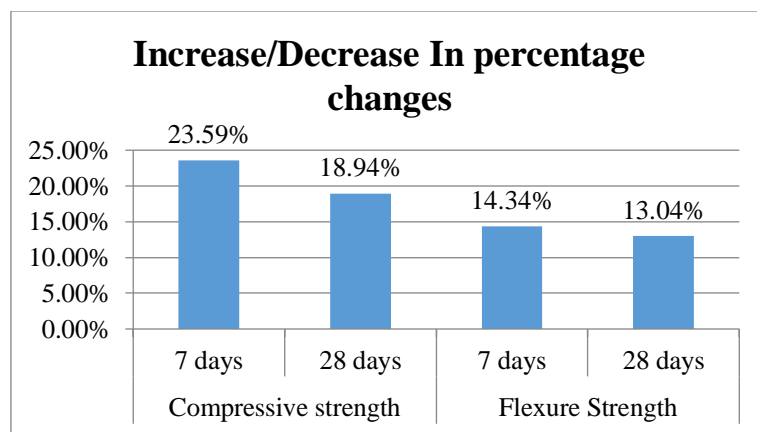
	<b>7 DAYS</b>	<b>28 DAYS</b>
<b>CUBE</b>	<b>15.40 N/mm<sup>2</sup></b>	<b>19.73 N/mm<sup>2</sup></b>
<b>BEAM</b>	<b>1.97 N/mm<sup>2</sup></b>	<b>3 N/mm<sup>2</sup></b>

**TESTING OF CUBE AND BEAM OF GEOPOLYMER CONCRETE**

	<b>7DAYS</b>	<b>28 DAYS</b>
<b>CUBE</b>	<b>20.13 N/mm<sup>2</sup></b>	<b>24.34 N/mm<sup>2</sup></b>
<b>BEAM</b>	<b>2.3 N/mm<sup>2</sup></b>	<b>3.45 N/mm<sup>2</sup></b>

**COMPARISON OF CONVENTIONAL CONCRETE WITH GEOPOLYMER CONCRETE**

<b>Strength Parameter</b>	<b>Testing Days</b>	<b>Conventional Concrete</b>	<b>Geopolymer Concrete</b>	<b>Increase/Decrease In percentage changes</b>
<b>Compressive strength</b>	7 days	15.40Mpa	20.13Mpa	23.59%
	28 days	19.73Mpa	24.34Mpa	18.94%
<b>Flexure Strength</b>	7 days	1.97Mpa	2.3Mpa	14.34%
	28 days	3.00Mpa	3.45Mpa	13.04%



### 3. CONCLUSION

1. Geopolymer concrete give higher strength than conventional concrete and it reduces the use of cement partially which means it reduces the emission of CO<sub>2</sub> in environment.
2. Use of geopolymer concrete reduce the waste of GGBS from industry, Fly Ash form power station and reduces environmental impact, Rice Husk ash.
3. Sodium silicate alkali activators used as accelerators in concrete.

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