To Enhance the Properties of Gepolymer Concrete for Different Molarities of NaOH and Varying Ratio of Na2SiO3/ NaOH

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Abstract- The development of fly ash based geopolymer concrete, need of a 'green' concrete in order to reduce the carbon dioxide emission from the cement production. Portland cement is one of the most energy intensive construction materials. Every ton of Portland cement releases a ton of carbon dioxide into the atmosphere. On the other side fly ash is waste material available from thermal power plant. Fly ash is possible up to certain extent to reduce the cementing material due to pozzolanic activity of fly ash. Therefore it is necessary to activate the fly ash by using alkaline activators. In present study investigations sodium based activators are used. Sodium hydroxide solution having different molarities concentration are used and Sodium silicate solution with Na_2O and SiO_2 were maintained constant throughout the experimentation. Alkaline solutions might be sodium based or potassium based. Generally sodium based solution is used from economy and availability point of view.The experimental paper presents the cube test results of geopolymer concrete with different molarities of sodium hydroxide with various ratio of sodium silicate solution. The adopted mix design of M30 grade of geopolymer concrete procedure is relevant to previously adopted experimental study adopted by S.V.Patankar et.al(2013) carried the research of binder ratio in the production of fly ash based geopolymer concrete. This existing cement concrete Mix Design was applied to Geopolymer Concrete as experimental study to identify the higher compressive strength of concrete cubes with different molarities of sodium hydroxide.

Keywords: fly ash; portland cement; geopolymer concrete ; sodium hydroxide; sodium silicate.

I.INTRODUCTION:

The greatest difficulties concern the developing countries which are in urgent need of implementations. A framework capable of providing necessary building houses, goods, & entire fundamental needs of their population. Potential for concrete & need for cement manufacture in developing countries are tremendous. Due to exponential use of concrete, cement production has increased at much higher speed. It is estimated that one MT of cement production approximately results into the production of one MT of carbon dioxide gas. This is the main cause of global warming. The main constituents of geopolymer concretre are source material which is rich in silica & alumina , alkaline liquids .The alkaline liquids are prepared from soluble alkali metals which are mainly sodium or potassium based. Sodium based solutions are easily available & are economical as compared to potassium based solutions

In geopolymer technology 100 % replacement of cement is possible by using the source materials and alkaline liquids. The most commonly used source materials are fly ash, GGBS, Metakeolin. Generally sodium hydroxide is available in solid state in the form of flakes or pellets. Cost of sodium hydroxide depends upon purity of substance. Sodium silicate is a combination of Na_2O and SiO_2.Ratio of Na_2O/SiO_2 also plays important role in Geopolymer concrete. This study aims to synthesize geopolymer concrete for varying ratio of Na_2SiO_3/NaOH. The present work is carried out in the framework of a project aims to produce the geopolymer concrete with different molarities of sodium hydroxide (NaOH) with the variation in ratio of sodium hydroxide to sodium silicate (Na2SiO3) solution to find out the higher compressive strength. In this project work, geopolymer is used as the binder instead of cement paste to produce the concrete. As in the case of OPC concrete, the coarse and fine aggregates occupy about 75 to 80% of the mass of