**MIX DESIGN OF CONCRETE**

**ABSTRACT**

This paper presents the experimental investigation done on performance of geo polymer concrete subjected to severe environmental conditions. The grades chosen for the investigation were M30 , M40, M50 and M60 , the mixes were designed for molarity of 8M and 12M. The alkaline solution used for present study is the combination of sodium silicate and sodium hydroxide solution with the ratio of 2.50 and 3.50.The test specimens were 150x150x150 mm cubes, 100x200 mm cylinders heat-cured at 60°C in an oven. The geo polymer concretes (GPCs) have inorganic polymer of aluminous-silicates as the binder whereas the conventional concretes have Portland cement (P-C) generated C-S-H gel (beside free lime). It is well known that mechanisms of attack by sulphuric acid and magnesium sulphates are different. Conventional concretes are generally not resistant to prolonged exposure to very high concentrations of these solutions because decalcification of C-S-H will occur. As a result of this, OPC concrete surface becomes soft and could be removed, thus, exposing the interior concrete layers to deterioration. At the same time as the magnesium sulphate attack, causes decalcification of C-S-H to form magnesium silicate hydrate (M-S-H). It also destroys the binding capacity of C-S-H and leads to a loss of adhesion and strength in concrete. Durability of specimens were assessed by immersing GPC specimens in 10% sulphuric acid and 10% magnesium sulphate solutions separately, periodically monitoring surface deterioration and depth of dealkalization, changes in weight and strength over a period of 15, 30 and 45 days. The test results indicate that the heat-cured fly ash-based geopolymer concrete has an excellent resistance to acid and sulphate attack when compared to conventional concrete. Thus we can say that the production of geopolymers have a relative higher strength, excellent volume stability and better durability.