

Assessment of the Performance of Fly Ash Based Geo-Polymer Concrete under Sulphate and Acid Attack

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Abstract : Concrete is the most commonly used construction material across the globe, its usage is second only to water. It is prepared using ordinary Portland cement whose production contributes to 5-8% of total carbon emission in the world. On the other hand the fly ash by product from the power plants is produced in huge quantities is termed as waste and disposed in landfills. In order to address the above issues mentioned, it is essential that other forms of binding material must be developed in place of cement to make concrete. The geo polymer concrete is one such alternative developed by Davidovits in 1980's. Geopolymer do not form calcium-silicate hydrates for matrix formation and strength but undergo polycondensation of silica and alumina precursors to attain structural strength. Its setting mechanism depends upon polymerization rather than hydration. As a result it is able to achieve its strength in 3-5 days whereas concrete requires about a month to do the same. The objective of this research is to assess the performance of geopolymer concrete under sulphate and acid attack. The assessment is done based on the experiments conducted on geopolymer concrete. The expected outcomes include that if geopolymer concrete is more durable than normal concrete, then it could be a competitive replacement option of concrete and can lead to significant reduction of carbon foot print and have a positive impact on the environment. Fly ash based geopolymer concrete offers an opportunity to completely remove the cement content from concrete thereby making the concrete a greener and future construction material.

Keywords : fly ash, geo polymer, geopolymer concrete, construction material

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