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Project Report Titled

"DURABILITY STUDIES ON GEOPOLYMER CONCRETE"

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ABSTRACT

There are environmental benefits in reducing the use of Portland cement in concrete, and using by-product material, such as fly ash, silica fume, ground granulated blast furnace slag, quarry dust etc. as substitutes. With silicon and alumina as the main constituents, fly ash has great potential as a cement replacing material in concrete. The concrete made with such industrial waste is eco-friendly and so it is called as "Green concrete".

A complete replacement of cement can be achieved using geopolymer technology. Fly ash when in contact with alkaline solutions forms inorganic alumino-silicate polymer product known as geopolymer. An effort has been made to observe the feasibility in Indian environment.

In the present investigation, the feasibility of using marginal materials/industrial by-products as eco-friendly and sustainable building material is studied. The materials considered are Fly ash, Ground Granulated Blast Furnace Slag (GGBFS) and Quarry Dust. Geopolymer binder concrete is synthesized without using conventional cement. The experimental program involves casting of geopolymer concrete specimens and testing the same at different ages for Strength (Compressive strength and Split tensile strength) and Durability (exposure to aggressive environments such as acid attacks, chloride attacks, elevated temperature, and wet and dry cycles) performances. The results reveal that Fly ash – ground granulated blast furnace slag (GGBFS) geopolymer concrete develops the strength even at ambient conditions without any conventional curing. Further, geopolymer concrete exhibit superior performance when exposed to aggressive environment.