Strength properties of Fly ash and GGBS based Geo-polymer Concrete

P Abhilash[1]*, C.Sashidhar[2], I.V.Ramana Reddy[3]

[1]Annamacharya Institute of Technology, Tirupati, Andhra Pradesh, India
[2]Jawaharlal Nehru Technological University, JNTUA, Anantapur, Andhra Pradesh, India
[3]Sri Venkateshwara University College of Engineering, Tirupati, Andhra Pradesh, India

Abstract: The second most consumed product in the world is Cement. It contributes nearly 7% of the global carbon dioxide emission. Geo-polymer concrete (GPC) is a special type of concrete that is manufactured using industrial waste like fly ash, GGBS which are considered as a more eco-friendly alternative to Ordinary Portland Cement (OPC) based concrete. By using this type of industrial by-products in concrete industry as a replacement for cement we can reduce the usage of cement which results in minimizing the emission of green houses gases into the atmosphere and also savings in cost. This project mainly aims at the study of effect of fly ash (FA) and ground granulated blast furnace slag (GGBS) on the mechanical properties of geo polymer concrete (GPC) when they were replaced for cement at different replacement levels (FA50-GGBS50,FA75-GGBS25, FA100-GGBS0) using Sodium silicate (Na_2SiO_3) and sodium hydroxide (NaOH) solutions as alkaline activators. Specimens were casted and cured for different curing periods like 7, 14, 28, 56 and 112 days at ambient room temperature to determine the mechanical properties of geo-polymer concrete. Test results shows that as the percentage of GGBS in the mix is increasing, mechanical properties such as compressive strength, split tensile strength and flexural strength were increasing.

Key words: Geopolymer concrete, GGBS, Fly ash, Sodium silicate, Sodium hydroxide, Compressive strength, Split tensile strength, Flexure strength.

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