

# Sustainable Development of High Strength Concrete by Partial Replacement of Cement with Micro Silica and Flyash

Mrs. Ch. Geetha, Nusrath Huzeifa, Y. Shivaprasanna Kumar, D. Manoj, J. Madhav

Christu Jyothi Institute of Technology & Science, Jangaon, Telangana, India

**Abstract:** *The production of Portland cement is widely recognized as both financially and environmentally burdensome due to its high energy consumption and significant carbon dioxide emissions. To address these challenges, researchers are exploring alternatives such as supplementary cementitious materials like pozzolanas, Pozzolanas which include fly ash and micro silica. These materials, though initially inert, exhibit cementitious properties when mixed with water and react chemically with calcium hydroxide during cement hydration. In this experimental investigation, to produce a high strength concrete a set of 3 different concrete mixtures were cast and tested with different cement replacement levels means fly ash (15%, 17.5%, 20%) and micro silica (5%, 7.5%, 10%) is added by the weight of cement and at each trial a PCE based superplasticizer of required amount is added to achieve the required slump and workability in M70 grade concrete. By incorporating fly ash and micro silica into the mix, Compressive strength tests are conducted at both 7, 14 and 28 days to assess the performance of the concrete*

**Keywords:** High strength concrete, Micro silica, flyash, PCE superplasticizer