ABSTRACT

This project investigates the performance characteristics of M40-grade geopolymer paver blocks as a sustainable alternative to conventional cement-based pavers. Geopolymers are synthesized using fly ash and ground granulated blast furnace slag (GGBS), activated by alkaline solutions (sodium hydroxide and sodium silicate), thereby reducing dependency on ordinary Portland cement and contributing to environmental conservation by utilizing industrial by-products.The study involved preparing nine different mixes with varying fly ash:GGBS ratios (60:40, 50:50, 40:60) and activator molarity levels (12M, 14M, and 16M). These mixes were evaluated through a series of tests, including the slump cone test (for workability), compressive strength, fresh and dry density, water absorption, and dimensional accuracy.Results showed that Mix 9 (40% fly ash, 60% GGBS, 16M) achieved the highest compressive strength of 39.5 N/mm^2, while Mix 6 demonstrated the best durability with the lowest water absorption (1.81%). Fresh and dry densities ranged from 2340–2520 kg/m^3 and 2290–2460 kg/m^3, respectively, confirming adequate compaction and material integrity across all mixes.