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Structural Performance of Basalt FRP Reinforced Geopolymer Concrete Members under Static and Impact Loads

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Extended Abstract

Geopolymer concrete (GPC) reinforced with basalt fibre-reinforced polymer (BFRP) bars offers a promising alternative to conventional steel-reinforced concrete for improving structural sustainability and durability. Very limited study has examined the behaviour of GPC members reinforced with BFRP bars under static and impact loading, to which structural elements might be subjected during service life. In this study, structural components such as beams and columns incorporating different concrete types (GPC and OPC) and reinforcement materials (steel and BFRP) were fabricated and tested under both static and impact loading using an impact testing system. A numerical model was also developed and validated against experimental data for GPC columns reinforced with BFRP bars, followed by a series of parametric studies. The results indicate that GPC components exhibited comparable performance to OPC components when subjected to static and impact loads.