

(54) Title of the invention : SUSTAINABLE STRUCTURAL SOLUTIONS: PERFORMANCE OPTIMIZATION OF GEOPOLYMER CONCRETE BEAMS REINFORCED WITH GLASS FIBER REINFORCED POLYMER

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(57) Abstract :

Sustainable Structural Solutions : Performance Optimization of Geopolymer Concrete Beams Reinforced with Glass Fiber Reinforced Polymer This patent provides a new approach for sustainable construction, in which the design and performance of geopolymer concrete beam with GFRP are optimized. This invention is a major improvement in the field of structural engineering as it utilizes the low-carbon footprint of geopolymer concrete and the high strength and corrosion resistance of GFRP. In particular, the patent elaborates on the optimization procedure with several variables, such as geopolymer concrete composition, GFRP reinforcement ratio, and beam general design. By analyzing and experimenting with all of these factors, the best of both worlds are discovered and lead to beams that have enhanced high mechanical properties and weight bearing capacities. The findings illustrate the improved load capacity and resistance to flexural strength and deflection for these optimized geopolymer-GFRP beams in comparison to traditional reinforced concrete beams experimental results. Additionally, the beams have good resistance against moisture, chemicals, and extreme temperatures. This new technology enables the construction industry to reduce the carbon footprint of concrete structures, make them last longer and perform better — a huge step toward transforming the construction industry. This patent moves towards a sustainable and resilient built environment by directly aligning with global sustainability goals and tackling the ongoing challenges of climate

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