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MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY

iTNT TAMILNADU TECHNOLOGY HUB

Thiagarajar College of Engineering
Since 1957
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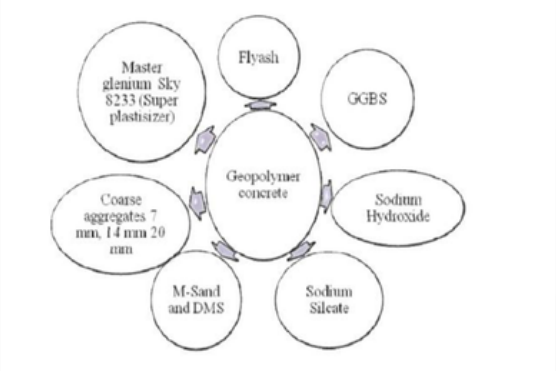
METHOD OF PREPARATION OF GEOPOLYMER CONCRETE USING ALTERNATIVE FINE AGGREGATES UNDER AMBIENT CURING CONDITIONS

Seeking parties interested in licensing and commercialization of technology.

Technology Brief

This technology discloses an eco-friendly geopolymer concrete composition and method of preparation that completely eliminates Portland cement while utilizing alternative fine aggregates to reduce greenhouse gas emissions. The formulation combines industrial by-products—fly ash and Ground Granulated Blast-furnace Slag (GGBS)—with alkaline activator liquids, coarse aggregates, superplasticizer, and alternative fine aggregates such as Manufactured Sand (M-Sand) and Demolished Masonry Sand (DMS) as direct replacements for conventional river sand. By optimizing the molarity of the alkaline solution and dry-to-wet pan-mixing sequences, the concrete achieves full mechanical strength under ambient curing conditions without requiring energy-intensive thermal or steam curing.

Block Diagram



Technical Applications

This sustainable geopolymer concrete is ideal for structural and non-structural civil engineering applications, including precast concrete elements, pavement slabs, retaining walls, structural columns, and beams. Additionally, its reliance on alternative fine aggregates like DMS and M-Sand makes it highly suitable for green building projects, sustainable urban infrastructure, and construction sites prioritizing carbon footprint reduction and circular economy practices.

Salient Features

- 100% Cement-Free & Low-Carbon Matrix
- Alternative Fine Aggregate Substitution
- Ambient Curing Capability

Glimpse of the Technology

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TECHNOLOGY SECTOR
Clean Energy & Sustainability

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TRL 3

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