Patent Search

Invention Title	Internal Curing Concrete Using Superabsorbent Polymers and Industrial By-products for Enhanced Strength and Durability
Publication Number	48/2025
Publication Date	28/11/2025
Publication Type	INA
Application Number	202541100350
Application Filing Date	16/10/2025
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	CHEMICAL
Classification (IPC)	C04B0028080000, C04B0018140000, C04B0028040000, C04B0018060000, C04B0111340000

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Abstract:

The invention relates to a novel internal curing concrete mixture incorporating superabsorbent polymers (SAP) and industrial by-products such as Ground Granulatec Furnace Slag (GGBS) and Silica Fume to enhance strength and durability. The mixture, designed with 0.1–0.3% SAP and 20–40% replacement of cement with industria products, enables self-curing by retaining water within the matrix, thereby reducing the need for continuous external curing. This self-curing mechanism minimizes sh cracks, improves compressive and flexural strength, and enhances durability against environmental exposures. The use of industrial by-products promotes sustainab lowering the carbon footprint and utilizing waste materials. The invention is particularly beneficial in water-scarce regions, offering an eco-friendly and cost-effective producing high-performance concrete with improved service life.

Complete Specification

Description:Conventional concrete requires continuous external curing to achieve desired strength and durability. Inadequate curing leads to microcracks, shrinkag reduced service life. Recent studies have shown that internal curing using superabsorbent polymers (SAP) can retain water within the concrete, enabling self-curing However, limited research exists on optimizing the combination of SAP with industrial by-products to enhance mechanical and durability properties while reducing carbon footprint. , Claims:1.
A concrete mixture comprising cement, fine aggregate, coarse aggregate, superabsorbent polymers (0.1–0.3%), and industrial by-products (20–40% GGBS and Silica to provide internal curing.
2.
The mixture of claim 1, wherein the concrete eliminates the need for continuous external curing while achieving compressive strength >30 MPa at 28 days.
3.
The mixture of claim 1, wherein the internal curing mechanism reduces shrinkage cracks by at least 20% compared to conventional concrete.
4.
The mixture of claim 1, wherein the use of industrial by-products reduces the carbon footprint of concrete production by at least 15%.
5.
The mixture of claim 1, wherein the incorporation of superabsorbent polymers and industrial by-products improves resistance to chloride ion penetration, thereby enhancing durability in aggressive environments.

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Page last updated on: 26/06/2019