Patent Search

Invention Title	Self-Curing Concrete Using Sodium Polyacrylate and Partial Cement Replacement with Ground Granulated Blast Furnace Slag (GGBS)
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Abstract:

This invention presents a sustainable internal curing concrete composition that enhances compressive strength, stability, and durability. Traditional curing methods o to retain moisture deep within the concrete matrix, leading to reduced performance. To address this, the invention incorporates Super Absorbent Polymers (SAPs), sp sodium polyacrylate, which can absorb 100–1000 times its weight in water. Acting as an internal reservoir, sodium polyacrylate swells into a gel within the concrete m moisture as needed to maintain hydration and prevent shrinkage. This improves resistance to autogenous and carbonation shrinkage, while ensuring the concrete's microstructure remains robust. Sodium polyacrylate, widely used in everyday products like diapers and spill absorbents, is harnessed here for its superior water rete properties.The SAP dosage ranges from 0.1% to 0.3% by weight of the cementitious material, while Ground Granulated Blast Furnace Slag (GGBS) replaces 10%, 20%, the cement. This combination reduces environmental impact, enhances workability, and strengthens mechanical properties. Experimental results confirm that using conjunction with GGBS significantly boosts compressive strength, reduces shrinkage, and improves overall durability and structural integrity. This innovative approach curing concrete offers long-term benefits for sustainable construction and infrastructure development.

Complete Specification

Description:1. Materials: Ordinary Portland Cement (OPC), GGBS, SAP, aggregates, and water.
2. Mix Proportions: M30 grade concrete with GGBS replacing 10–30% of cement and SAP added at 0.1–0.3%.
3. Self-Curing Mechanism: SAP absorbs water during mixing and slowly releases it, ensuring continued hydration and reducing the risk of surface cracking.
4. Preparation: Dry materials (cement, GGBS, aggregates) are mixed, SAP is added, and water is gradually introduced. The mix is placed and compacted, with SAP retaining moisture for internal curing.
5. Performance Characteristics:
- SAP is more cost-effective than conventional curing methods.
- SAP enhances compressive strength and structural integrity.
- GGBS combined with SAP shows improved strength in self-curing concrete.
- SAP significantly reduces shrinkage and cracking, offering long-term benefits

, C , Claims: Claim 1: A method for improving the compressive strength of M30 grade concrete by partially replacing cement with Ground Granulated Blast Furnace (GGBS), wherein the addition of GGBS results in a noticeable rise in compressive strength.
This claim clearly identifies a method of improving concrete strength using GGBS, which is a well-researched industrial by-product. It highlights the direct benefit of addition in compressive strength enhancement, making it scientifically valuable and practical for implementation.
Claim 2: A self-curing concrete composition with SAP, wherein an addition of 0.2% SAP increases compressive strength, but a combination of 0.2% SAP and 30% GGB

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