Patent Search

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Abstract:

The invention relates to an improved concrete composition in which Ordinary Portland Cement (OPC) is partially replaced by a synergistic blend of Alccofine and Sugarcane Bagasse Ash (SCBA) to enhance mechanical performance and microstructural characteristics. Alccofine provides micro-filler and hydration-accelerating effects, while SCBA contributes pozzolanic reactivity, resulting in increased compressive, split tensile, and flexural strengths. The combined supplementary cementitious materials refine the interfacial transition zone, reduce porosity, and improve durability compared to conventional OPC concrete. The invention further provides optimized replacement ratios, methods of preparation, and performance validation through standardized testing. The resulting concrete offers a cost-effective, sustainable, and high-performance alterr suitable for structural and non-structural civil engineering applications.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention relates to the field of cementitious materials, construction engineering, and sustainable concrete technology, and more particularly to an enhanced concrete composition in which Ordinary Portland Cement (OPC) is partially replaced with a synergistic blend of Alccofine, an ultrafine mineral admixture, and Sugarcane Bagasse Ash (SCBA), an agro-industrial pozzolanic by-product, to improve the mechanical performance and microstructural characteristics of hardened concre The invention further pertains to the formulation, proportioning, hydration mechanisms, and structural behavior of concrete incorporating these dual supplementary cementitious materials (SCMs), thereby achieving improvements in compressive strength, split tensile strength, flexural strength, densification of the interfacial transitior zone, and overall durability. The invention additionally contributes to sustainable construction practices by reducing OPC consumption, lowering associated carbon emissions, and enabling beneficial utilization of industrial and agricultural waste materials in high-performance concrete applicable to structural and non-structural civil engineering works.

BACKGROUND OF THE INVENTION

[002] Concrete remains the most widely used construction material in civil engineering projects due to its versatility, strength, and ease of application. However, the conventional production of Ordinary Portland Cement (OPC), which forms the principal binder in concrete, is associated with significant environmental concerns, most

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