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(57) Abstract :

ABSTRACT This study explores the development of pellucid concrete by integrating 0 to 4% optical fibers into the concrete matrix to enhance light-transmitting properties. The incorporation of optical fibers aims to balance the aesthetic appeal of natural light transmission with structural performance. Experimental results indicate that as the percentage of optical fibers increases, the compressive strength of the concrete exhibits a reduction. Specifically, the compressive strength decreases progressively with higher concentrations of optical fibers, highlighting a trade-off between structural integrity and optical performance. Additionally, the density of the concrete diminishes with the increased inclusion of optical fibers, further impacting its mechanical properties. Conversely, the Photonic Optical Fiber (POF) light transmission efficiency rises significantly with the increase in fiber content, demonstrating enhanced translucency. These findings underscore the potential of pellucid concrete for applications where natural lighting and visual effects are prioritized, while also emphasizing the need for optimizing the balance between mechanical strength, density, and optical properties in structural design.

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