

Performance of bamboo biochar as partial cement replacement in mortar

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ABSTRACT

Pyrolysis under limited oxygen conditions at high temperatures is used to produce bamboo biochar. The construction industry often utilizes cement, which is a significant contributor to greenhouse gas emissions and environmental damage. To decrease the use of cement, this study examines the effectiveness of bamboo biochar as a partial cement replacement in mortar. The study determines the optimal percentages of bamboo biochar as a partial replacement and evaluates its mechanical performance in terms of compressive and flexural strength. The percentages tested include a smaller range of 0.5%, 1%, 1.5%, and 2%, and a higher range of 5%, 10%, 15%, and 20%. The samples are cured for 7, 14, and 28 days. The study concludes that 10% is the optimal percentage replacement for compressive strength, while 5% is optimal for flexural strength. Additionally, the study finds that according to ASTM C618-19, bamboo biochar is best classified as a filler rather than a pozzolan, as it does not meet the class N-pozzolan requirement.

KEYWORDS

Bamboo biochar; Cement replacement; Compressive; Flexural; Performance; Mortar

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