Postprint: Study on Preparation Process and Strength Mechanism of Autoclaved Desert Sand Bricks

Authors: Wang Shan

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Abstract

To obtain desert sand autoclaved bricks with excellent performance and favorable economic benefits, this study investigates the mechanical properties, hydration characteristics, and microstructural features of desert sand autoclaved bricks by varying the molding pressure, autoclaving time, and autoclaving temperature, thereby providing technical support and a theoretical basis for optimizing the preparation process. The results indicate that: the optimal preparation process for MU15-grade desert sand autoclaved bricks is a molding pressure of 20 MPa, autoclaving time of 8 h, and autoclaving temperature of 180 °C; scanning electron microscopy observations reveal that appropriate molding pressure, autoclaving time, and autoclaving temperature promote internal physicochemical reactions within the bricks, enabling the hydration product C-S-H to rapidly form a network interlocking structure that enhances mechanical performance; X-ray diffraction analysis of the phase composition in hardened autoclaved brick specimens demonstrates that excessively high temperatures and prolonged autoclaving times cause the strength-contributing hydration product C-S-H to transform into calcium zeolite, which is unfavorable for strength development.

Full Text

Preamble

Due to corruption of the source material, no readable textual content remains. Only the following mathematical placeholders have been preserved: $ # “%”& $ through 6.

Note: Figure translations are in progress. See original paper for figures.