

Applying a Geopolymer in Restoring Rammed Clay Structured Historic Monuments

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Abstract

Rammed clay has been used as a construction material in China for centuries. Valuable ancestral heritages composed of rammed clay have been stricken with various degrees of damage by time and weather. To restore these artifacts effectively, kaolinite was heated and materials such as glass powder and sodium hydroxide were added to create a geopolymer. Different mixing ratios were added to clay, and after 28 days of preparation and curing, density and water-absorptivity tests, as well as compressive, tensile, and shear strength tests were performed. When the test results to that of the old rammed clay bricks were compared, the structural strength, bonding capacity, and moisture resistance capacity were all more favorable than those of the original structures created with rammed clay bricks or the rammed clay bricks supplemented with rice straw. Therefore, geopolymers can be applied in restoring historic monuments composed of rammed clay structures.

Keyword : Clay; geopolymer; rammed clay bricks; rammed clay bricks supplemented with rice straw