Effect of Plant Aggregates on Mechanical Properties of Earth Bricks

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Abstract: A building material is mainly characterized by its mechanical performance, which provides proof of its quality. However, the measurement of the compressive or flexural strength of an earth-based material with plant aggregates, which is very ductile, is not fully standardized. The objective of this study is to determine the compressive and flexural strengths of a composite made of earth and 0, 3, or 6% of barley straw, hemp shiv, or corn cob. Given the manufacturing processes available, cylindrical compressed specimens were studied in compression, whereas extruded specimens were studied in flexion. Two protocols were tested for compressive strength measurements: one with direct contact between the specimen and the press and the other with reduced friction. The test with reduced friction engendered a huge decrease of the stress and a slight decrease of the strain. For both compressive and flexural strengths, the specimens made of earth alone were the most resistant, followed by composites containing straw. The influence of two different treatments applied to the straw is also discussed.
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