

Mechanical properties and hygroscopicity behavior of compressed earth block filled by date palm fibers

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Abstract

This paper investigates the mechanical properties and hygroscopicity behavior of compressed earth block (CEB) filled by date palm fibers in order to valorize local building materials and the contribution to the cost reduction of housing especially in rural areas. In this framework, a series of blocks were fabricated using a soil, stabilised with cement, the crushed sand and fibers, and compacted with a static loading by applying three compacting stresses (1.50, 5 and 10 MPa). Better result of the dry compressive strength was observed by CEB with 0.05% of fiber content, 8% cement content and compaction pressure of the 10 MPa. But for the remaining studied cases, the addition of fibers under compaction pressure has an adverse effect on the properties of CEB. Impact of palm fibers on the tensile strength was unfavorable because of their low tensile strength, very high water absorption, by heterogeneity or distribution and a low adhesion with the matrix. Could be said that by increasing cement content and decreasing palm fibers content there is a general decrease in total water absorption of the blocks. The swelling of the blocks increases with decreasing cement content and increasing palm fibers content.

Keywords Compressed earth block; Date palm fibers; Mechanical properties; Water absorption; Swelling.

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