

Compressed Earth Block: Achieving Building Code Requirements with Lime Stabilization

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Abstract:

Lime stabilized compressed earth block (CEB) fabricated on site for use in the construction of a 60 unit development is evaluated according to earthen building code material requirements to determine the optimal level of hydrated lime addition for dry compressive strength, wet compressive strength, modulus of rupture and water absorption. Testing is conducted in two phases: 1) Determination of suitability of native soil for stabilization with lime using a soil engineering approach; 2) Determination of physical properties of CEB at 0%, 1%, 3%, 5%, 7%, and 10 volume percent lime addition. The soil engineering test results for 3% volume or weight addition on lime indicate that optimum properties are obtained at 13-17% moisture contents. For CEB the optimal recommended amount of lime addition is 7 % by volume and between 5 and 7% moisture. At this addition level, dry compressive strength increases by 147 %, wet compressive strength increases by 93.2 %, modulus of rupture increases by 98.4% and water absorption is reduced by 14%. Lime-stabilized CEB meets the most stringent requirements of the applicable building code and therefore may be used in those areas of the structure most prone to damage from liquid water.

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