

Influence of natural fiber dosage and length on adobe mixes damage-mechanical behavior

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Abstract

This study addresses the use of a natural fiber (pig hair), a massive food-industry waste, as reinforcement in adobe mixes (a specific type of earthen material). The relevance of this work resides in the fact that earthen materials are still widely used worldwide because of their low cost, availability, and low environmental impact. Results show that adobe mixes' mechanical-damage behavior is sensitive to both (i) fiber dosage and (ii) fiber length. Impact strength and flexural toughness are increased, whereas shrinkage distributed crack width is reduced. Average values of compressive and flexural strengths are reduced as fiber dosage and length increase, as a result of porosity generated by fiber clustering. Based on the results of this work a dosage of 0.5% by weight of dry soil using 7 mm fibers is optimal to improve crack control, flexural toughness and impact strength without statistically affecting flexural and compressive strengths.

Keyword

Adobe mixes| |Animal fiber| |Mechanical properties| |Damage control| |Fiber-reinforced