

EFFECTS OF SUPER-CRITICAL CARBONATION CURING ON EXTRUDED VEGETABLE FIBRE CEMENT

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Abstract.

The vegetable fibre and cellulosic pulp, which are widely available in most developing Countries, can be used as appropriate materials for cementitious matrix reinforcement. However, significant losses in mechanical performance have been observed in vegetable fibre cement composites after wet/dry cycling, due to the degradation mechanisms of cellulose fibres in the alkaline environment. Accelerated carbonation curing has been identified as a developing technology which may have potential for the mitigation strategy to reduce deterioration of cellulosic fibres and to improve microstructure and mechanical behaviour these composites. The objective of this work was to evaluate physical characteristics and mechanical performance of extruded vegetable fibre cement, reinforced with bleached Eucalyptus pulp and residual sisal fibres, submitted to super-critical carbonation curing. The soak and dry accelerated ageing cycles test was carried out. The results suggest that super-critical carbonation curing led to lower water absorption in the composites and, consequently, to increased bulk density, which improved the microstructure. Besides, pore size distribution of the carbonated fibre cement indicates that a considerable microstructure refinement occurred after carbonation. It was observed that super-critical carbonation curing have a significant effect on modulus of rupture and crack growth resistance of the carbonated composite when compared to those non-carbonated. The energy of fracture and relative work of crack-propagation of the carbonated extruded vegetable fibre cement were well-conserved after accelerated ageing cycles.