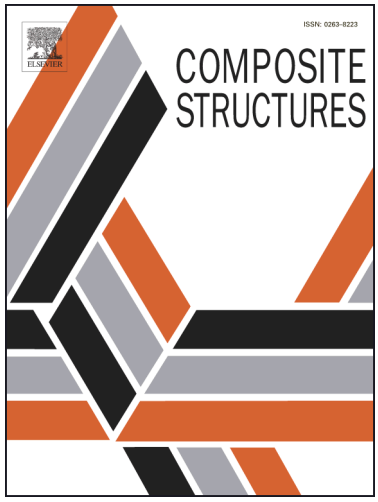

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Shrinkage characteristics and strength recovery of nanomaterials–cement composites

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ABSTRACT

In this study, we evaluated the shrinkage at an early age and strength development over an extended period of nanomaterial-containing cement composites. Nanoclay and graphite nanofibre were used at 0, 0.25, 0.5, and 1.0 wt% of the cement weight. Crack control was evaluated using a plastic shrinkage test. The flexural strength was measured to assess the strength recovery of the nanoclay- and nanofibre–cement composites. To examine the strength recovery, a load of 60% of the peak load was applied to the plain cement composite not containing any nanomaterial to induce crack formation. These cracked specimens were cured in water and air for an additional 28 days, and the flexural strength was measured again. Plastic shrinkage was reduced by ca. 70%, regardless of the nanomaterial type. The nanoclay–cement composites recovered more than 100% of their strength, regardless of the curing condition.

Key words: flexural strength, nanoclay, nanofiber, recovery, self-healing, shrinkage

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