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Carbon nanotubes reinforced reactive powder concrete

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Abstract

In this paper, four types of multi-walled carbon nanotubes (MWCNTs) were incorporated into reactive powder concrete (RPC) with water or heat curing. The enhancing effects of MWCNT types and curing methods on mechanical properties of RPC were investigated. Experimental results indicate that adding proper type and content of MWCNTs can effectively improve mechanical properties of RPC including flexural strength, fracture energy, compressive strength/toughness and flexural strength to compressive strength ratio. In general, these mechanical properties of MWCNTs filled RPC with heat curing are superior to that with water curing, which indicates that heat curing is more beneficial for reinforcing impact of MWCNTs to RPC than water curing. In most cases, the critical length of MWCNTs in RPC is smaller than actual length, which indicates MWCNTs will be snapped when damage occurs in RPC. In addition, the reinforcement of MWCNTs to RPC results from crack bridging and pull out effects.

Keywords: A. Carbon nanotubes and nanofibers; B. Strength; B. Mechanical properties; D. Mechanical testing

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