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## Use of biochar as carbon sequestering additive in cement mortar

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### Abstract

Biochar is widely considered as effective way of sequestering carbon dioxide. The possibility of using it to enhance the mechanical strength and reduce permeability of cement mortar is explored in this study. The effect of fresh biochar and biochar saturated with carbon dioxide a priori on the setting time, mechanical strength and permeability of cement mortar was evaluated. The biochar was prepared from mixed wood saw dust at 300°C and added to mortar during mixing at 2% by weight of cement. It was found that addition of fresh biochar and saturated biochar reduce initial setting time and significantly improve early compressive strength of mortar. The experimental results suggested that biochar addition can impart ductility to mortar under flexure, although flexural strength was not significantly influenced. Water penetration and sorptivity of mortar was significantly reduced due to addition of biochar, which indicate higher impermeability in biochar added mortar. However, it is found that addition of fresh biochar offers significantly higher mechanical strength and improved permeability compared to biochar saturated with carbon dioxide. These results suggest that biochar has the potential to be successfully deployed as a carbon sequestering admixture in concrete constructions that also provides a way to waste recycling.

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