Setting Time and Compressive Strength of Mortar Containing Cockle Shell Powder as Partial Cement Replacement

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ABSTRACT

Environmental degradation caused by deforestation activities for harvesting of limestone from the hills and its calcination process at cement factory along with disposal of cockle shell waste from fisheries industries is in need of resolution. In view of sustainable green environment, approach of utilizing cockle shell waste as partial cement replacement in cement production would reduce pollution caused by both industries. Thus, this research investigates the effect of cockle shell powder as partial cement replacement on setting time and compressive strength of mortar. A total of five types of mortar mixes consisting different percentage of cockle shell powder as partial cement replacement from 0%, 10%, 20%, 30%, and 40% by weight of cement were prepared. Setting time test were conducted on fresh paste. All specimens were subjected to water curing until the testing age. Compressive strength test were conducted on hardened mortar cubes at 3, 7 and 28 days. Finding shows that integration of cockle shell powder as partial cement replacement influences the setting time and compressive strength of mortar. Suitable combination of 10% cockle shell powder successfully enhances the compressive strength of mortar. Conclusively, success in transforming the cockle shell waste to be used as partial cement replacement in mortar production able to reduce cement consumption, save landfill usage for trash dumping and promote cleaner environment for healthier lifestyle of community nearby.

KEYWORDS

Cockle Shell; Compressive Strength; Mortar; Partial Cement Replacement; Setting Time

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