

The effect of water to cement ratio on the fresh and hardened mortar containing steel slag as cement replacement material

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ABSTRACT

The development of construction requires large amounts of resources which resulted in scarcity in good quality natural resources. Cement, being the main and widely used binder in the construction industry, are sourced from non-renewable source which causes negative impact to the environment. This study was conducted to evaluate the effect of SS on the fresh and hardened properties of mortar under conditions of different replacement ratio (2.5% and 12.5%) and water to cement ratio (w/c) (0.4, 0.45, 0.5). Flow table test, compressive strength test, flexural test and water absorption test have been conducted in this study. Results showed that flow table value of fresh mortar increased with the increase of w/c for both SS replacement ratio. Fresh property of mortar with lower SS replacement ratio was more sensitive to the variation of w/c. The increased w/c ratio has negative effect on the compressive strength and flexural strength of mortar specimens. Water absorption capacity of SS mortar increases with the increasing on w/c for both SS replacement ratio and the mortar specimens with higher SS replacement ratio has higher water absorption capacity at the same w/c level.

KEYWORDS

Compressive strength; Flexural strength; Mechanical; Solid waste; Water absorption

ACKNOWLEDGEMENTS

This research is supported by Universiti Malaysia Pahang under Postgraduate [grant number: PGRS200376] and Beijing Jiaotong University.