

Mechanical and water absorption properties of cement mortar incorporating basic oxygen furnace slag as fine aggregate

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ABSTRACT

The steel industries produce much waste called steel slag (SS) which can be classified into three broad classification namely basic oxygen furnace slag (BOFS), electric arc furnace slag (EAFS) and ladle furnace slag (LFS). The disposal of these SS resulted in land occupation, water pollution and other environmental issues. The aim of this research is to study the performance of cement mortar by using BOFS as partial sand replacement. The properties of both fresh and hardened mortar containing 10%, 20% and 30% of BOFS with particle size <0.15mm were examined. The mechanical properties of BOFS mortars were tested at 1, 7, 28 and 60 days. While for water absorption, it was conducted only at 28 days. Results show that the increase of BOFS causes reduction in workability and water absorption which indicates good improvement in the water tightness of mortar. From the perspective of compressive strength, the replacement of BOFS increases the strength up to 14% compared to the reference specimen at 28 days. The compressive strength and flexural strength development in the mortar with 20% BOFS content yielded the highest strength gains compared to all specimens at later age.

KEYWORDS

Compressive strength; Natural sand; Steel slag

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