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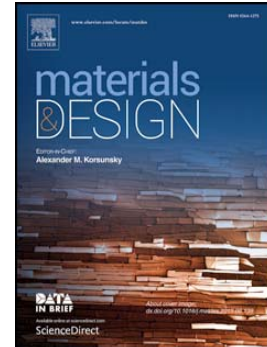
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Effect of rice husk ash and other mineral admixtures on properties of self-compacting high performance concrete

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Abstract

The present study aims investigating the effects of superplasticizer (SP) and of mineral admixtures on self-compactability and compressive strength of mortar and of self-compacting high performance concrete (SCHPC). The results show that SP dosages higher than the saturation SP dosage (SSD) did not influence flowability and plastic viscosity, and induced the bleeding. Contrary to fly ash (FA)/silica fume (SF), the incorporation of rice husk ash (RHA) increased the SSD of mortar, slightly decreased filling and passing abilities and significantly increased plastic viscosity and segregation resistance of SCHPC. The incorporation of RHA also eliminated the bleeding of mortar and SCHPC. Having a macro-mesoporous structure, RHA can be used as a viscosity modifying admixture, and improve the robustness of SCHPC with respect to the variation in the high SP dosage. Supposedly, with the coarse particle size and large specific surface area, RHA induces great intermolecular attraction forces with water and SP. Similar to SF, RHA was effective in improving compressive strength of SCHPC, particularly at a larger percentage cement replacement and at later ages. RHA and FA had synergistic effect on self-compactability and compressive strength. Compressive strength of SCHPC incorporating 20 wt.% FA and 20 wt.% RHA reached about 130 MPa after 56 days.

Key words

Self-compacting high performance concrete; rice husk ash; silica fume; saturation superplasticizer dosage; self-compactability; compressive strength

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