

Performance of binary and ternary blended cement concrete containing eggshell and silica fume

ABSTRACT

This research presents the investigation on the performance of cement mortar containing different preparation methods of eggshell powder (ESP). Four (4) types of eggshell powder (ESP) were prepared as the cement replacement, including untreated air-dried eggshell powder (UAESP), untreated oven dried eggshell powder (UOESP), treated airdried eggshell powder (TAESP) and treated oven dried eggshell powder (TOESP). The cement mortar with water to cement ratio of 0.485 were mixed with 20% of ESP by the weight of the cement. The effects of ESP were investigated in terms of workability, compressive strength, rate of strength development and hardened density at 7 and 28 days. Compared to untreated ESP mortar, treated ESP mortar had lower workability, higher compressive strength, better rate of strength development, and higher density. Meanwhile, the effect between air-dried and oven dried ESP on the workability of cement mortar is insignificant. However, it was discovered that the oven dried ESP mortar had higher compressive strength, better rate of strength development, and higher density than the air-dried ESP mortar. It can be concluded that the most suitable preparation methods of ESP to be used as cement replacement is the treated oven dried (TOESP) method.