

The effect of nano silica on short term drying shrinkage of POFA cement mortars

ABSTRACT

This study investigates effects of nano silica on short-term drying shrinkage of mortars with palm oil fuel ash (POFA) during the first 28 days of curing. Furthermore, moisture content, hydration volume, and permeability were measured in order to study underlying mechanisms. It was revealed that addition of nano silica to samples with 30% POFA as cement replacement lowered the drying shrinkage by 7.5%. Also, it increased the strength development rate by 15% from 7 to 28 days of curing. Nano silica advantageously affected the shrinkage by refining the microstructure, increasing the hydration volume and lowering free water in cement matrix.

Keyword: Nano silica; Palm oil fuel ash; Drying shrinkage; Mortar