

Effects of Water Cementitious Material Ratio and Volume Fraction of Fine Aggregates on Plastic Shrinkage of Mortar

by

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Abstract

It was determined that the plastic shrinkage of cementitious material occurs when the velocity of water vaporization from the surface increased compared with that of bleeding. However, in this present study, it was reported that negative pressure in high-strength concrete of low water cement ratio occurs due to hydration without vaporization. It is suggested that shrinkage is influenced by not only vaporization from the surface but also self-desiccation due to hydration. In this study, the effect of self-desiccation on the plastic shrinkage of cement paste and mortar was investigated on the basis of experimental results of the change in pore water pressure and shrinkage behavior at very early ages. Furthermore, the effects of the volume fraction of fine aggregates and curing conditions on the plastic shrinkage of mortar were investigated. It was found that plastic shrinkage is markedly influenced by the self-desiccation and volume fraction of fine aggregates at low water cement ratio.

Keywords: Plastic shrinkage, Pore water pressure, Chemical shrinkage, Self-desiccation, Volume fraction of fine aggregates

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