

Experimental Evaluation of Drying Shrinkage of Saturated Lightweight Aggregate Concrete

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Concrete structures always deal with a challenge due to the drying shrinkage of concrete, caused by self-desiccation of the cement paste. In this evaluation, autogenous length change of mortar and concrete mixes due to the drying shrinkage, in which the dense aggregates were replaced partly or fully by lightweight aggregate were investigated. Replacement percentages were 10%, 15%, 20%, 25% and 100%. The aggregate replaced by lightweight up to 15% were saturated completely or only up to 30% and 60%. The test specimens were cured under controlled conditions at 23 ± 1 °c and the development of compressive strength, tensile strength, and volume changes due to drying shrinkage were determined

The experiments confirmed that use of saturated lightweight aggregate partially or completely, as a complement of the water needed for cement hydration process, effects the early volume changes drastically. In other words, the water, required to produce calcium silicate in the cement hydration process, can be stored inside the lightweight aggregates and is returned to the cement particles during drying out. As the result, two advantages, i.e. preventing the drying shrinkage of concrete in early age and reducing the concrete weight, are achieved by using saturated lightweight aggregate.