

## **SRAs – RECENT STUDIES**

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### **ABSTRACT**

Shrinkage in concrete and mortar occurs in three basic modes: autogenous, plastic, and drying. Autogenous shrinkage is the change in volume under constant temperature and without loss of moisture from the concrete to the environment and originates from the reduction of the relative humidity in the pores as the hydration of the cement takes place. Most autogenous shrinkage occurs in the course of the first 7 days after water is added to concrete. Plastic shrinkage occurs before final-set due to the rapid evaporation of the bleed water from the exposed surface of the concrete. Drying shrinkage, on the other hand, occurs after final-set due to a reduction in volume caused by the evaporation of the water from the concrete. Drying shrinkage, and particularly autogenous shrinkage, are the most detrimental, because they increase the potential for cracking. Autogenous shrinkage is less significant than drying shrinkage for normal strength concrete.

Shrinkage is an unavoidable property of concrete that can lead to cracking, thereby limiting the serviceability of concrete structures; though shrinkage can be minimized. The magnitude of the shrinkage depends on the concrete composition, especially the content and properties of the cement, and the water/cementitious materials ratio (w/cm), as well as the environmental conditions.

Shrinkage cracking can be a critical problem in concrete construction, especially for flat-slab structures such as highway pavements, industrial slab-on-grade, for parking garages, and bridge decks. One way to reduce the shrinkage cracking is to provide reinforcement in the form of wire mesh to resist tensile forces. In recent years, short, randomly distributed fibers have been used to control shrinkage cracking.