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# Durability of recycled aggregate concrete prepared with carbonated recycled concrete aggregates

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**Abstract:**

The mechanical properties of recycled aggregate concrete (RAC) incorporating carbonated recycled concrete aggregates (RCAs) have been previously reported. However, the durability of RAC prepared with carbonated RCAs remains to be accessed. In this study, the durability properties of RAC incorporated with non-carbonated RCAs and carbonated RCAs, in terms of deformation (drying shrinkage), water absorption and permeability (bulk electrical conductivity, gas and chloride ion permeability), are presented. The experimental results indicated that: (i) the incorporation of the carbonated RCAs in RAC not only helped to reduce the water absorption of RAC, but also reduced its permeability; (ii) when 100% carbonated NRCAs was used, the extent of impermeability improvement was 15.1%, 36.4% and 42.4% for bulk electrical conductivity, chloride ion permeability and gas permeability, respectively. Comparing the results of the mechanical and durability properties, the $CO_2$ curing treatment of RCAs had a greater beneficial impact on the durability properties of the RAC; and (iii) there was a good correlation between the water absorption of RAC and its permeability indicators. The water absorption value of RAC may be used as a criterion of the durability of RAC.

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