عنوان مقاله:

Studying Tensile Strength of the Recycled Coarse Aggregate Concrete Using Double-Punch Test

محل انتشار:

Journal of Rehabilitation in Civil Engineering, دوره 10, شماره 3 (سال: 1401)

تعداد صفحات اصل مقاله: 21

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خلاصه مقاله:

Using the recycled materials, such as waste concrete aggregates can be considered as a suitable solution for resolving environmental issues. The recycled coarse aggregates (RCA) can be utilized effectively in manufacturing structural concretes. Due to hardness and errors of direct tensile and splitting tensile tests, double -punch test (DPT) can be regarded as a reliable test method for evaluation of tensile strength in concrete specimens. In this study, application of DPT was investigated as a less known test method for RCA concretes considering different effective factors, such as water-to-cement ratio (۰.۴, ۰.۵, and ۰.۶), maximum nominal size of RCA (۱۰ and ۱۹ mm), curing conditions (wet and dry), and replacement level of RCA (۰, ۵۰, and ۱۰۰%) and the results were validated by direct tensile and splitting tensile test results. A statistical analysis was performed to indicate significance of each variable in DPT results of RCA concretes. Also, compressive strength and modulus of elasticity were assessed and their relationships with tensile strength of the specimens were studied. The maximum RCA size, replacement level of RCA, and mechanical properties were diminished in mixtures by increasing water-to-cement ratio. Generally, DPT results showed remarkable proximity to direct tensile test results with a slight increase. In wet curing condition, mean values of splitting tensile, DPT, and direct tensile tests in the specimens containing ۱۹mm of RCA were ۱۱.۶۱, ۱۰.۰۶, and ۹.۴۴% higher than those containing ۱۰mm of RCA, respectively. Moreover, results of statistical analysis showed that the studied factors had significant effects on the results and they must be regarded in evaluation of DPT.

کلمات کلیدی:

Double-punch test (DPT), Direct tensile test, Splitting tensile test, Recycled Coarse Aggregate (RCA), Maximum aggregates' size