

# **Utilizing Recycled Concrete and Stone Aggregate as Replacement for Natural and Crushed Virgin Aggregate**

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## **Abstract**

The mechanical properties of recycled concrete aggregate from Al-Anbar province in Iraq is presented in this paper. Recycled concrete and stone aggregates were utilized as replacements for both natural and crushed virgin aggregate. Four series of tests were conducted to study various replacement ratios (0.25, 0.50, 0.75 and 1.0) effect on compressive strength, splitting tensile strength and modulus of rupture. Density of concrete in addition to its water absorption were also investigated. Results of this work show that replacing natural and crushed virgin aggregate with waste concrete aggregate extracted from left-over concrete cubes and concrete barriers did not affect its mechanical properties significantly. In fact, in this study the general trend is that the compressive strength increases with increasing the replacement ratio from 0.0 to 1.0. However, the tensile strength showed different behaviour as there was a limit for the strength increase with replacement ratio where beyond it the strength started decreasing again. This limit varied between 0.50 and 0.75 depending on the type of aggregate used and the type of the test. The age of test did not affect the behaviour of the trialled mixes significantly. In addition to that, recycled stone aggregate proved to be an alternative choice only for lower grade concrete because it reduced both compressive and tensile strength in comparison to the reference mix