

ABSTRACT

Evaluation of the Strength Parameters of Concrete with Recycled Concrete Aggregate (RCA) and High-density Polyethylene (HDPE) Flakes

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The purpose of this research paper was to evaluate the strength parameters namely, compressive, tensile splitting and flexural strength of concrete when the natural coarse aggregate is replaced with RCA and HDPE flakes. The compressive and tensile splitting strength test was performed on specimens with up to 100% RCA replacement and up to 25% HDPE replacement. The optimum percentage of RCA and HDPE was determined based on the compressive strength and tensile splitting strength test results and these optimum percentages were used to create design mixes integrating both recycled aggregates. The flexural, compressive and tensile splitting strength tests were conducted on these design mixes with a combination of various percentages of natural coarse aggregate, RCA and HDPE flakes to determine the most suitable design mix which can be used in the concrete industry. Additionally, sieve analysis, water absorption, aggregate impact value and specific gravity were determined for each coarse aggregate.

Keywords: concrete, natural coarse aggregate; RCA; HDPE flakes; compressive strength test; tensile splitting strength test; flexural strength test; slump test; workability; sieve analysis; water absorption; aggregate impact value; specific gravity.