

Evaluation of Marshall Compactor effect on the degradation of recycled concrete aggregate

ABSTRACT

Demolishing structures presents the problem of disposing of crushed cement and concrete. This form of pollution is a cause for anxiety for environmental awareness agencies, inspiring the creation of more construction and structural policies and regulations that aim to address handling and disposing of crushed concrete. In place of throwing away crushed concrete, it ought to be reused. This study explores the feasibility of reusing crushed concrete in pavement construction applications, by adding it as substitute for aggregate in asphalt mixtures. The study focuses on the physical properties of crushed concrete and its degradation after the compaction of aggregates; in particular, it takes into account its absorption and abrasion qualities. The generally accepted advice is to mix crushed concrete with naturally sourced conventional aggregates. This study evaluated the suitability of variously proportioned and graded mixtures of conventional aggregates and Recycled Concrete Aggregate (RCA); six different proportions (0%, 20%, 40%, 60%, 80% and 100%) and five grades of crushed cement concrete were assessed using a 5 mm aggregate passing sieve and a 1.18 mm retaining sieve. The resulting mixtures were subjected to compaction of 20, 40, 60, 80 or 100 blows, using a Marshall Compactor. The results of the study reveal that the crushed concrete and the mixtures with the recommended ranges of sieve sizes and conventional aggregates are suitable for roads that have a medium volume of traffic.

Keyword: Recycled concrete aggregate; Asphalt mixtures; Compaction; Recycling; Aggregate gradation; Degradation; Environment