

Development of a Double Coating Technique for Recycled Concrete Aggregates Used in Hot-mix Asphalt

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Abstract : The use of recycled concrete aggregates (RCAs) in hot-mix asphalt (HMA) production could ease natural aggregate shortage and maintain sustainability in modern societies. However, it was the attached cement mortar and other impurities that make the RCAs behave differently than high-quality aggregates. Therefore, different upgrading treatments were suggested to enhance its properties before being used in HMA production. Disappointedly, some of these treatments had caused degradation to some RCA properties. In order to avoid degradation, a coating technique is developed. This technique is based on combining of two main treatments, so it is named as double coating technique (DCT). Dosages of 0%, 20%, 40% and 60% uncoated RCA, RCA coated with Cement Slag Paste (CSP), and Double Coated Recycled Concrete Aggregates (DCRCAs) in place of granite aggregates were evaluated. The results indicated that the DCT improves strength and reduces water absorption of the DCRCAs compared with uncoated RCAs and RCA coated with CSP. In addition, the DCRCA asphalt mixtures exhibit stability values higher than those obtained for mixes made with granite aggregates, uncoated RCAs and RCAs coated with CSP. Also, the DCRCA asphalt mixtures require less bitumen to achieve the optimum bitumen content (OBC) than those manufactured with uncoated RCA and RCA-coated with CSP. Although the results obtained were encouraging, more testing is required in order to examine the effect of the DCT on performance properties of DCRCA- asphalt mixtures such as rutting and fatigue.

Keywords : aggregate crushed value, double coating technique, hot mix asphalt, Marshall parameters, recycled concrete aggregates

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