

Laboratory Investigations on the Utilization of Recycled Construction Aggregates in Asphalt Mixtures

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Abstract : Road networks are increasingly expanding all over the world. The construction and maintenance of the road pavements require large amounts of aggregates. Considerable usage of various natural aggregates for constructing roads as well as the increasing rate at which solid waste is generated have attracted the attention of many researchers in the pavement industry to investigate the feasibility of the application of some of the waste materials as alternative materials in pavement construction. Among various waste materials, construction and demolition wastes, including Recycled Construction Aggregate (RCA) constitute a major part of the municipal solid wastes in Australia. Creating opportunities for the application of RCA in civil and geotechnical engineering applications is an efficient way to increase the market value of RCA. However, in spite of such promising potentials, insufficient and inconclusive data and information on the engineering properties of RCA had limited the reliability and design specifications of RCA to date. In light of this, this paper, as a first step of a comprehensive research, aims to investigate the feasibility of the application of RCA obtained from construction and demolition wastes for the replacement of part of coarse aggregates in asphalt mixture. As the suitability of aggregates for using in asphalt mixtures is determined based on the aggregate characteristics, including physical and mechanical properties of the aggregates, an experimental program is set up to evaluate the physical and mechanical properties of RCA. This laboratory investigation included the measurement of compressive strength and workability of RCA, particle shape, water absorption, flakiness index, crushing value, deleterious materials and weak particles, wet/dry strength variation, and particle density. In addition, the comparison of RCA properties with virgin aggregates has been included as part of this investigation and this paper presents the results of these investigations on RCA, basalt, and the mix of RCA/basalt.

Keywords : asphalt, basalt, pavement, recycled aggregate

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