Behaviour of recycled asphalt pavements at low temperatures

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Abstract

This paper summarizes the results of a study conducted to evaluate the behaviour of recycled asphalt pavements with respect to low-temperature cracking. For this purpose, a recycled mix consisting of 45.2% reclaimed materials and 54.8% virgin materials as well as a virgin control mix were used in the research program. In the design of both mixes, their initial properties were kept as close as possible to each other to allow for a proper comparison between recycled and virgin asphalt pavements. Using mix properties that were determined experimentally in the laboratory, thermal stresses resulted from drop in temperature and the expected cracking temperatures were determined for both mixes. An experimental analysis based on laboratory tests that consider the pavement properties only as well as a more complete theoretical analysis based on a finite element computer program known as FETAB were included in this study. The program incorporates subgrade parameters, as well as pavement properties and thickness. Using these variables as inputs to the program, the expected performance of recycled and virgin asphalt pavements of various thicknesses and resting on different types of subgrade, with respect to low-temperature cracking, was studied. The results of the study indicated that recycled asphalt pavements would perform better than virgin asphalt pavements of similar initial properties. *Key words*: asphalt, finite element, low-temperature cracking, reclaimed, recycled, thermal stresses.