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Characterization and Design of a Crumb Rubber Modified Asphalt Mix Formulation

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Abstract : Laboratory trial results of mixing crumb rubber produced from discarded tires with 60/70 pen grade Kuwaiti bitumen are presented on this paper. PG grading and multiple stress creep recovery tests were conducted on Kuwaiti bitumen blended with 15% and 18% crumb rubber at temperatures ranging from 40 to 70 °C. The results from elastic recovery and non-recoverable creep presented optimum performance at 18% rubber content. The optimum rubberized-bitumen mix was next transformed into a pelletized form (PelletPave®), and was used as a partial replacement to the conventional bitumen in the manufacture of continuously graded hot mix asphalts at a number of binder contents. The trialed PelletPave® contents were at 2.5%, 3.0%, and 3.5% by mass of asphalt mix. In this investigation, it was not possible to utilize the results of standard Marshall method of mix design (i.e. volumetric, stability and flow tests) and subsequently additional assessment of mix compactability was carried out using gyratory compactor in order to determine the optimum PelletPave® and total binder contents.

Keywords : crumb rubber, Marshall mix design, PG grading, rubberized-bitumen
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