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14. Supplementary Notes

15. Abstract

Objective

The main objectives of this study are: (1) To examine the effects of specified fine aggregate angularities and binder grades on the volumetric properties, rutting resistance and tensile strength of Superpave HMA mixes; and (2) To evaluate and compare the rutting resistance of local Superpave HMA mixes of different combinations of aggregate blends and binder grades using the asphalt pavement analyzer.

Scope

In this project, the appropriate laboratory tests and analysis were done on the HMA mixes to evaluate the effect of the fine aggregate angularities and the binder grades on the HMA properties and performance. The performance of the various Superpave were evaluated based on their deformation under the wheel load of the asphalt pavement analyzer. A 0.276 inch (7.0 mm) deformation under the wheel load of the APA is considered the minimum criterion for rutting failure. The relative performance of the mixes was also examined based on comparing their APA deformation values.

Summary

For the dry condition, the 45-70 mix design outperformed all other design cases followed by the rest of the FAA of 45 cases. The FAA 43 mix cases had performed slightly better than the FAA 42 cases. But the 42-64 mix had a better result than the 43-58 mix indicating that the positive influence of a higher binder grade overweighs the negative influence of a slightly lower FAA value. The rutting values for both of the FAA 42 mix design cases were hovering around the 7.0 mm specification value. All of the mix design cases under dry condition passed the 7.0 mm specification except for the FAA 40 mix design cases.

For the wet condition, only the FAA 45 mix design cases have actually passed the specification. The FAA 43 and FAA 42 mix design cases did fail the specification but the FAA 40 mix design cases triggered the maximum APA failure value of 14.0 mm.

The 45-64 mix design case performed really well with a TSR value of 96%. The 45-58 mix design also did well with a TSR value of 90%. Even though the TSR values for the FAA 42 mix cases were lower than the TSRs for the FAA 45 mix cases as expected, the 42-64 mix design case presented an anomaly. The 42-64 case not only performed inferior to the 42-58 mix design case but the dry and wet strengths were much higher than all the other design cases. The 42-64 mix design case was repeated and the same results were obtained.

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