



Project Number
BE928

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Performance Evaluation of SP-9.5 and SP-12.5 Superpave Mixtures

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Current Situation

All transportation agencies want superior performing asphalt.

Superpave is a well-established asphalt mix design method used by many State departments of transportation (DOTs). It was developed by the Strategic Highway Research Program and gives engineers and contractors the tools to design better-performing asphalt pavements.

Current Florida Department of Transportation (FDOT) specifications allow the use of Superpave (SP)-12.5/ Friction Course (FC)-12.5 mixtures in heavy traffic areas, but not SP-9.5/FC-9.5 mixtures, which are commonly used for lower traffic levels.

Previous studies have compared the rutting and cracking performance of several SP-9.5/FC-9.5 and SP-12.5/FC-12.5 mixtures. They showed that the SP-9.5 mixtures could have equivalent, if not better, performance than SP-12.5 mixtures, but these studies were limited. A comprehensive study considering different factors (aggregate types, aggregate gradation, binder grades, binder contents, design gyrations, and compaction levels) was needed to determine if SP-9.5/FC-9.5 mixtures and SP-12.5/FC-12.5 mixtures have equivalent performance for materials commonly used in FDOT asphalt pavements.

Research Objectives

The objective of this project was to compare the performance of SP-9.5/FC-9.5 to SP-12.5/FC-12.5 Superpave asphalt mixtures and then determine if SP-9.5/FC-12.5 mixtures were at least equivalent to SP-12.5/FC-12.5 mixtures in terms of cracking and rutting resistance, including durability, for use in heavy traffic volume conditions.

Project Activities

After a literature review, the Texas A&M University team designed and executed a full factorial experiment. The experiment included 24 mixture designs (i.e., two gradations [SP-9.5 and SP-12.5], two aggregate types [granite and limestone], two binder grades [PG 67-22 and PG 76-22], and three design gyrations [50, 75, and 100]). For each mixture, specimens were prepared at two compaction levels and then seven performance tests were conducted on each.

The team then performed a statistical analysis to compare the performance between SP-9.5 and SP-12.5 mixtures.

Project Conclusions and Benefits

The test results and analysis show only limestone SP-9.5 PG 67-22 mixtures have worse rutting performance than the corresponding SP-12.5 mixtures. Other SP-9.5 mixtures show equivalent or better performance (rutting, cracking, and durability) than the corresponding SP-12.5 mixtures. Based on this conclusion, the researchers recommended changes to the current FDOT specifications and pavement design procedures to allow SP-9.5 mixtures in heavy traffic volume conditions.

Using SP-9.5 mixtures will allow less expensive, smaller aggregates in heavy traffic level applications, which make up 30 percent of FDOT's network, thereby facilitating better use of natural resources and lowering construction costs.



Superpave mixtures set for low traffic levels in Florida were recently tested for performance under heavy traffic levels.

For more information, please see fdot.gov/research.