

Improving on Superpave's success

Superpave was a landmark achievement of the Strategic Highway Research Program, providing tools for the design and construction of high-performing asphalt pavements. NCHRP research helped improve upon a good thing, fine-tuning Superpave by removing an unnecessary restriction.

A puzzle in Georgia

Superpave—the Superior Performing Asphalt Pavements program—initially recommended against the use of pavement aggregates that had an overabundance of fine particles, classifying these into a “restricted zone” based on aggregate size.

However, engineers at Georgia DOT were among those who thought the restricted zone seemed too limiting. When Superpave was initiated, Georgia already had high-quality pavements in place constructed from restricted zone aggregates. Superpave discouraged the future use of these same aggregates, along with others used by DOTs across the United States that appeared to be performing very well. Only solid research could get to the bottom of this puzzle.

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Angularity the key, not size

Researchers from the National Center for Asphalt Technology at Auburn University investigated Superpave's restricted zone through NCHRP Project 09-14 and published their results in 2001 as Report 464, *The Restricted Zone in the Superpave Aggregate Gradation Specification*.

The key performance issue turned out to be particle angularity rather than size. Crushed pieces of Georgia granite have a sharp, angular structure, and even small pieces of aggregate can be part of strong and durable asphalt pavements. On the other hand, rounded particles—such as beach sand—remain inappropriate for pavement construction. However, Superpave already restricted small, rounded particles through its existing angularity and volumetric requirements.



Aggregate angularity affects pavement performance

Therefore, this NCHRP research concluded that the restricted zone was an unnecessary and redundant component of Superpave. Report 464 resulted in changing AASHTO's *Standard Specification for Superpave Volumetric Mix Design* to remove the restricted zone, and state DOTs followed suit with local requirements. Says Georgia DOT's Peter Wu, “NCHRP research improved Superpave and let our state keep using a superior building material. It wouldn't be cost-effective for us to crush local rock and then remove and throw away the smaller pieces of aggregate. It turns out that it isn't necessary to go through that.”

A win-win

Another user of Georgia's granite is Florida. Florida has fewer local sources of aggregate and is stretched to keep up with the demands of its many highway construction projects. Thanks to this research, Florida can make use of abundant granite aggregate sources from its neighbor to the north, shipping in by train Georgia's raw materials much more easily than aggregates from sources such as Mexico or the Caribbean. Gale Page, Florida DOT's state flexible pavement materials engi-

neer, says, “This research turned out to be a win for Georgia as an aggregate supplier and a win for Florida as an aggregate user. The changes to Superpave's recommendations made the difference.”

Another state, a similar story

Across the Gulf of Mexico from Florida, Texas is another among many states enjoying savings from this research. Lisa Lukefahr of Texas DOT says, “After the publication of this report, TxDOT modified its Superpave specification to match NCHRP's findings that the restricted zone should not be restricted after all. TxDOT could then do performance testing on mixes without worrying about the restricted zone, and the research ultimately saved the department money by allowing better use of available materials.”

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NCHRP Report 464 may be found on TRB's Web site at

http://www.trb.org/news/blurb_detail.asp?id=3952. Hard copies are available from the TRB Bookstore at <http://www.trb.org/bookstore/>.



NCHRP research improved Superpave and asphalt pavements

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