

SEAUPG 2003 CONFERENCE

SOUTH CAROLINA'S RAP SPECIFICATION DEVELOPMENT

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SC's RAP Spec Development

Overview

- Contractor's were stockpiling more and more RAP
- SCDOT's RAP Specification prevented use of RAP in Surface 1C Mixes which it primarily a resurfacing mix. Also contactors are not allowed to vary binder grades
- A survey a Southeastern States RAP Specification was conducted
- An Economic Analysis was conducted to determined the impact of RAP usage in South Carolina

SCDOT's RAP Spec Development

- SCDOT Old RAP allowed the following percentages:

Mix Type	% RAP
Base Types 1 & 2	10-30
Binder 1 & 2 and Surface Types 3 & 4	10-25
Surface Type 1	10-20
19.0 mm Superpave	10-15

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The Results of the RAP Survey of the Southeastern States were as follows:

Virginia: Does not have an upper limit for any type of mix except for Polymer Modified mixes in which the limit is 15%. RAP percentages are limited by design criteria. Va. does have a minimum Recovered Penetration and Ductility values. Va. does change PG grades

SC's Rap Spec Development

- West Virginia: Similar to Virginia. RAP is limited by design specification requirements. W.Va. does change PG grades.
- Alabama: Some Specific Gravity Limitations. If RAP does not contain any chert material it is allowed at 20%. RAP must be traceable back to a DOT project or must be approved by the Department. RAP from unknown origins, approved by the Dept, shall not exceed 15%.

SC's Rap Spec Development

- Georgia: Can replenish stockpiles. 1 test per 1,000 tons of RAP for AC content and gradation. Percentages of RAP are based upon predetermined ranges for asphalt content and several controls sieves and their respective variability.
- Louisiana: Surface Mixes 15%, Intermediate 20, and base 30%. Maximum 20% Rap in all wearing courses.

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- North Carolina: Varies PG grade based on Mix and RAP percentages. RAP is tested for the following: AC content, gradation, effective specific gravity, asphalt viscosity if more than 25% is proposed.

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- Economic Analysis: RAP is valued at \$20 per ton based on net gain of replacing virgin aggregate, replacing virgin AC, and shipping costs. These are 2001 production numbers.
- **Total RAP Tons used: 641,134 @ \$20 per ton equals a \$12,822,687 impact**
- **RAP is not allowed**

Mix	Tons	% RAP	RAP Tons
Binder	434,784	30	130,435
Sur 1	228,791	15	34,319
Sur 1C	636,181	15	95,427
Sur 3	133,926	15	20,089
Sur 4	70,219	15	10,533
Thin Lift	4,033	15	605
OGFC	115,621	15	17,343
12.5 mm	158,032	15	23,704
19.0 mm	116,959	30	35,087
Patch	41,673	30	12,502
Base	870,297	30	261,089

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- Goals Identified in Research:
- Get RAP into Surface 1C mixes at 15%
- Give Contractors the ability to continuously replenish stockpiles
- Address Viscosity Issues with the ability to change binder grades.
- Keep it simple

SC's RAP Spec Development

- The RAP committee made up of SCDOT personnel, FHWA, and Industry Representatives compromised on various issues and the following is a draft of the RAP Specification that hopefully will be implemented in January 04.

Recycled Asphalt Pavement Material – RAP

- Description – Reclaimed asphalt pavement (RAP) will be allowed for use in hot mix asphalt pavements. RAP shall be defined as processes asphalt material either milled from SCDOT project(s) (Category A) or asphalt plant waste that has been cured and crushed that may not be combined with milled material from SCDOT project(s) (Category B). Stockpiles of RAP material shall be labeled in a manner satisfactory to the Research and Materials Engineer. These signs shall be maintained by the Contractor on each stockpile to identify the source(s) and Category.

Initial Approval

- Initial Approval – Initial approval, for both category A and B, Will be Based on extraction tests performed at a rate of not less than one per 1000 tons of RAP, with a minimum of ten tests per stockpile. The average of these initial extraction test will be used to determine the gradation and binder content that will be used to represent the RAP in the design of the job mix formula blend. Limits will be set, based on the 93rd percentile, of these results by Research and Materials Engineer for field control and replenishing purposes. The SCDOT reserves the right to reject, by visual inspection, any stockpiles that are not kept clean, homogeneous and free of foreign materials.

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The maximum amount of RAP in recycled hot mix asphalt mixtures is as follows:

Table 1 – Maximum amount of RAP

Type Mix	% RAP	
	Cat. A	Cat. B
Asphalt Aggregate Bases Types 1 & 2	30*	25*
Binder Types 1 & 2	25*	15
All Surface Mixtures (unless otherwise noted)	20*	10
Surface Type 1C	10	10
19.0 mm Intermediate	15	10

- *RAP is limited to the lesser of the amount indicated or 15% maximum when introduced in the hot elevator.

Reclaimed asphalt pavement will not be allowed in any asphalt mixtures that utilizes modified binders (i.e. PG 76-22) or stabilizing fibers.

Approved Category A

- Approved Category A – Category A stockpiles may not be replenished. This Material must be composed of milled asphalt material from SCDOT projects. No further testing is required after initial approval unless deemed necessary by the Research and Materials Engineer.

Category B

- Approved Category B – Category B stockpiles may be replenished an unlimited number of times, provided that the material for replenishment meets all requirements for initial approval prior to replenishing and remains within the tolerances for uniformity set by the Research and Materials Engineer.

Table 2 – Quality Control Test for Category B RAP

Test Parameter	Frequency	Test Method
Binder content, %	1 per 3,000 tons of RAP	SC-T-64 or SC-T75
Gradation	1 per 3,000 tons of RAP	SC-T-76 or SC-T-92
Abson, Pa-s	1 per 10,000 tons of RAP	AASHTO T 170