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 Bituminous Concrete Materials

Stone Matrix Asphalt

Stone Matrix Asphalt (SMA) is a different type of pavement, that relies on direct stone on stone contact and a heavy asphalt mastic to provide superior rutting resistance, compared to conventional dense graded Superpave designs. SMA was piloted on a portion of the Sharon-Bethel I-89 paving project, to determine the feasibility of use on Vermont. Testing is ongoing to characterize the material, and future testing will be conducted to monitor its service life.

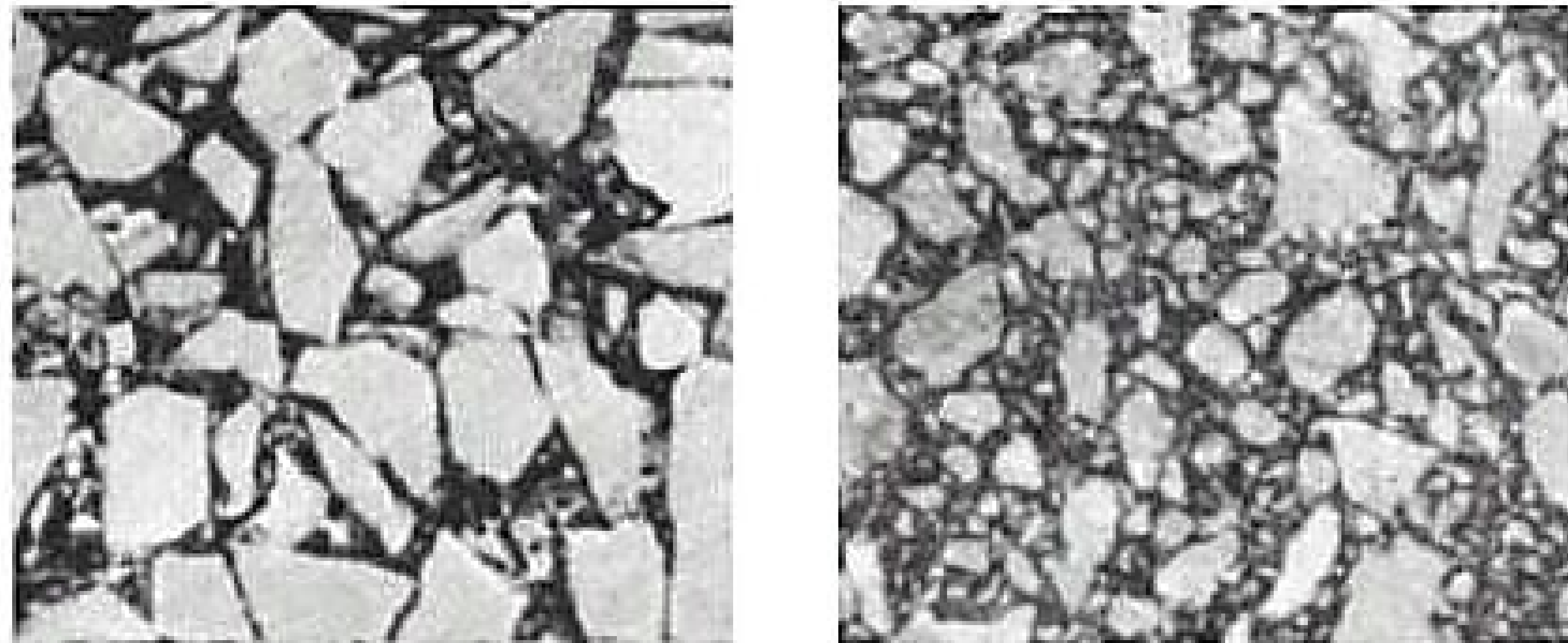


Figure 1. SMA compared to Dense Graded HMA

Construction Outcomes

To incorporate SMA into this project, a special provision was drafted to detail the material and construction requirements. SMA is notoriously more difficult to work with, containing fibers to stabilize the high asphalt content, and making it more difficult to compact. Acceptance testing showed compliant mix properties, and good in place compaction. Lessons learned from this project will be carried forward in future SMA implementations.



Figure 2. SMA construction, and an SMA sample for acceptance testing

First Year Feedback and Results

Initial feedback from Construction was positive, with anecdotal comments to how well it compacted, and rigid it appeared compared to Superpave. Performance results show a crack resistance mix, with slightly more rutting potential than HMA. Maintenance feedback was mixed with comments through the first winter of how difficult it was to determine if treatment was needed, due to the open surface texture and light coloration. Initial results from profiling indicate it maintains excellent ride quality after its first winter, with an IRI below 50.

Test / Parameter	SMBCP			Type IVS		
	Average	SD	COV (%)	Average	SD	COV (%)
IDEAL-RT (RT _{Index})	64.4	4.3	6.6	80.6	18.2	22.5
SSR (RSI)	13.0	2.8	21.3	4.6	1.6	33.9
HWTT Rut Depth @ 20,000 passes (mm)	45°C	3.2	0.6	1.9	0.3	12.7
	50°C	4.2	0.04	1.01	1.4	36.1

Figure 3. SMA and Superpave Performance Results

Implementation

The SMA and Superpave test section will be monitored for several years, with cores taken this season to determine in service air voids. Performance testing standards are being developed for roadway cores to investigate the potential for use to coincide with this project. This would allow us to document the cracking and rutting resistance change as the pavement ages in place. The special provision has been amended with lessons learned, and made available for future trails, as well shared with neighboring states who are interested in trying the treatment.

Acknowledgments

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