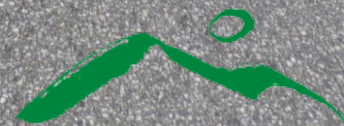


Vermont Stone Matrix Asphalt Trial Project

T2 Grant/EDC-6 TOPS

Dr. Ian Anderson

Bituminous Concrete Materials Manager



VERMONT

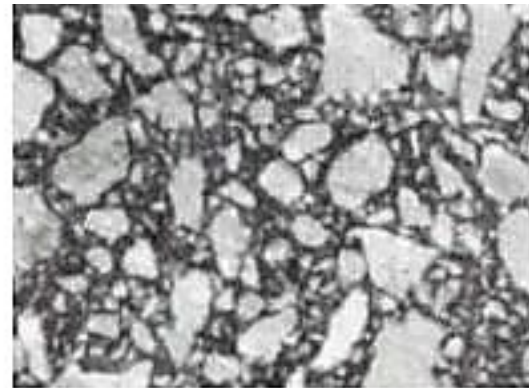
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Stone Matrix Asphalt

SMA deviates from the conventional dense graded mixture, it relies on high quality gap graded coarse aggregates to form an interlocking structure of stone-on-stone contact, bound and filled by a heavy asphalt mastic. Fibers are often used to prevent drain down, which is a concern. SMA is thought to offer both rut resistance through its stone skeleton, and flexibility from the high asphalt content.



Stone Matrix Asphalt



Dense Graded HMA

Research Workplan

- Compare the SMA to the conventional HMA over 5-year period. Intended to inform future use.
 - Acceptance (Air Voids, Density, Ride Quality)
 - Performance testing (Rutting and Cracking)
 - Field observations annually to assess performance
 - Roadway cores to track property and performance test changes
 - Annual condition assessment with Profiler
 - Biannual friction and skid testing.



Performance Testing

	HWT VTrans (FHWA)	IFIT VTrans (FHWA)	IDEAL-CT VTrans (FWHA)
VTrans SMA Spec	<10 mm	>10	
Mix Design SMA	2.9 mm	10.6	
Mix Design HMA	2.0 mm	12.3	
Production SMA	4.56 mm (3.2 mm)	19.8 (11.9)	312.9 (176.6)
Production HMA	2.63 mm (1.9 mm)	11.8 (8.7)	193.9 (93.2)
2021 HMA Average	3.18 mm	12.4	208

Stone Matrix Asphalt

Early Observations

- Overall, successfully construction of SMA thus far. Very hard to shovel/fix, rolling close to paver is important. Very little movement after initial consolidation.
- Density is likely ensured through mix design, cannot be “improved” in the field.
- There are a few areas showing some permeability, likely areas of connected voids. May consider reducing air voids down to 3.5 to reduce the chance next time, and make mix designing easier to achieve.
- Winter Observation by Maintenance is that it is difficult to determine when treatment is needed, as the surface texture appears different than typical smooth HMA.
- First year ride results show a good Ride with little change.

Next Steps

- Draft Construction and 1st year Report with T2 Funds.
- Workplan Actions
 - Annual field observations to identify issues
 - Friction testing to compare BWC, HMA, SMA
 - Pavement Distress: IRI, Cracking, Rutting, Texture
 - Cores taken annually to determine density, and potentially for performance testing.
- Work on revisions to the special provision, for another project, or full spec implementation.

Thanks!

- Thanks to the FHWA MATC, for advice and visiting Vermont in person during construction to assist.
- Thanks to VTrans staff for their efforts to implement this trial, in particular Chris Barker the RE, Andy Willette the paving inspector, and Ryan Darling our Paving Engineer.
- And thanks to our VTrans materials field and lab staff, and Aaron Schwartz for the performance testing