

Targeted Overlay Pavement Solutions (TOPS)

Targeted overlays match treatments to high-priority, high-need locations.

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U.S. Department
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Highly Modified Asphalt

The highly modified asphalt (HiMA) mixture is produced using asphalt binder containing 7 to 8 percent polymer, mostly styrene-butadiene-styrene, which is more than twice what is used in conventional polymer-modified binders. By increasing the polymer content, the binder-polymer structure changes from asphalt binder, with a dispersed swollen polymer phase, to a swollen polymer with a dispersed asphalt binder phase. The phase reversal in the HiMA acts as an elastic reinforcement in the asphalt binder and improves asphalt mixture cracking resistance. In addition, considerable improvement to the rutting performance of HiMA mixtures has been reported. A special low viscosity polymer eliminates the compatibility and workability problems during production and construction, as well as concerns associated with heavily modified mixes.

HiMA mixtures have been used over a wide range of applications ranging from full depth to thin asphalt overlays under different traffic conditions. Although long-term pavement performance data for HiMA mixtures are not readily available in the field, where promising performance in early pavement life have been reported, accelerated performance was observed over multiple 3-year research cycles on the National Center for Asphalt Technology Pavement Test Track.

HiMA mixture:

- Offers cost-effective and durable asphalt pavements with a reduced thickness.
- Can be constructed on pavement sections consisting of weak foundation layers.
- Have similar workability as polymer-modified mixtures and therefore, no special plant adjustment is needed for production.

Location	Description
Alabama	<ul style="list-style-type: none">• Intermediate course on U.S. 231• Early rutting in the existing asphalt layer
Georgia	<ul style="list-style-type: none">• Thin AC overlay at the junction of Routes 138 and 155• Rutting and shoving were the main concerns
Minnesota	<ul style="list-style-type: none">• Mill and overlay on Normandale Road, City of Bloomington• Subjected to heavy traffic due to its location adjacent to the airport
New Hampshire	<ul style="list-style-type: none">• NH Route 101 with a high level of traffic• Mill and fill operation with a 2-inch intermediate course followed by a 1.5-inch HiMA wearing course
Oklahoma	<ul style="list-style-type: none">• I-40 (west of Oklahoma City) with 25,300 AADT (17 million ESALs)• Mill and a 1.5-inch HiMA wearing course
Oregon	<ul style="list-style-type: none">• Thin overlay on I-5 in Oregon• Ruts and raveling in the existing pavement due to heavy trucks and high traffic volumes
Vermont	<ul style="list-style-type: none">• US-7 with 4,500 AADT• Existing pavement with 14 years of service and in "fair to good" condition

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Asphalt Materials

Tim Aschenbrener

FHWA Office of Preconstruction, Construction, and Pavements

(720) 963-3247

Timothy.Aschenbrener@dot.gov

www.fhwa.dot.gov/everydaycounts

