

Hot Mix Asphalt (HMA) Massachusetts Trends

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MassHighway - Overview

Annual Construction Budget of \$450<u>+</u> million
 Staff of Approximately 1900 employees
 Maintain 2525 lane miles of Interstate and 6205 lane miles of Non-Interstate Highway
 Inspect and maintain approximately 4400 bridges

Hot Mix Asphalt Surfaces

- Virtually the entire system is surfaced with HMA. In the past 20 years, MassHighway has constructed only four new Portland Cement Concrete roadway sections ~ approximately 5000' total.
- Approximately 1 million tons of HMA are placed by MassHighway annually. With a few exceptions (capacity improvement, widenings, etc.) this is on maintenance resurfacing projects.

Since 2000, MassHighway has placed approximately 450,000 tons of polymer modified HMA. Most of this has been on the Interstate Highway System.

Interstate Pavement Condition

2007



State Maintained Highway Condition

(Non-Interstate)

2007



Types of Modifiers Used?

SBR Polymers (Latex)
SBS Polymers
Chemically Modified Crumb Rubber
Crumb Rubber (Arizona Process)
Wax Based Warm Mix Technology

Types of Modified Wearing Surfaces

Conventional Open Graded Friction Courses
European Open Graded Friction Courses
Gap Graded Mixes (Experimental)
Dense Graded HMA

Types of Preventive Maintenance Wearing Surfaces

- Elastomeric Friction Course (EFC) Gap Graded Mix
- NovaChip
- Developing and Testing Polymer Modified Dense and Gap Graded Mixes to be placed in 1<u>+</u>" lifts

Intersections

- We have high traffic intersections prone to failure due to rutting.and shoving
- Two methods of addressing these locations "larger stone" mixes and modified asphalts. We are combining these methods to improve the stability in these locations.
- We are currently advertising a district-wide resurfacing contract with a modified asphalt to resurface the rutted intersections in a high traffic corridor.

Stress Absorbing Membrane Interlayers (SAMI)

Use Two Types

- HMA SAMI 1" thick "strain tolerant" layer placed over a Jointed Reinforced Concrete Pavement to waterproof and reduce reflective cracking on 10 miles of I-495. SEM Materials has designed a SAMI layer for this project ("STRATA")
- Rubber Chip Seal –placed over concrete roadways to water proof and reduce reflective cracking. MassHighway has three of these projects ongoing.

Warm Mix Modifier

- MHD has advertised a project to overlay six miles (49 lane miles) of I-93 from Boston to Quincy.
- Warm Mix and Latex modifiers will be used on 35,000 tons of HMA.
- Warm mix was specified to reduce placement temperatures and extend the paving window.
- Latex modified asphalt and a "large stone" wearing surface are being specified to reduce the potential for future rutting.

Ongoing and Upcoming Research

 "Fix It First: Utilizing the Seismic Property Analyzer and MMLS to Develop Guidelines for the use of Polymer Modified Thin Lift HMA vs.
 Surface Treatments" (New England Transportation Consortium)

"Evaluation of Modified Performance Grade Binders in Thin Lift Maintenance Mixes and a Reflective Crack Relief Layer Mix" (Pool Fund Study)

MassHighway is developing a contract with UMass Dartmouth's Pavement Testing Laboratory relating to the "Evaluation of Specialized Hot Mix Asphalt Mixes for Massachusetts"

Upcoming Demonstration Project

- Preventive Maintenance Resurfacing of I-295 Attleboro – North Attleboro (5 miles)
- Thin (1") Gap Graded Overlay with two types of asphalt Northbound
 - PG 76-34) Chemically Modified Crumb Rubber (2.5 miles)
 - PG 64-28 Asphalt with 20% Rubber (Arizona Process (2.5 miles)
- Novachip (1/2" Max. Stone) with two types of asphalt- Southbound
 - PG 64-28 and a Modified Emulsion (2.5 miles)
 - PG 64-28 with Rubber and a Modified Emulsion (2.5 miles)



Where Are We Going?

- The use of polymer modified thin lift mixes for preventive maintenance is on the increase.
- MassHighway is expanding its Pavement Preservation program from only Interstates to all state maintained roadways.
- With these treatments, cost is a concern.We are monitoring the long term cost effectives and benefits of these strategies.
- We continue to work with the industry in using state of the art materials and practices.

