MDOT THE PROFILER

Research Division

Lift Thickness in Hot Mix Asphalt, HMA

Special Points of Interest

- **Lift Thickness in Hot Mix Asphalt**
- **Work Program 2010**
- **Local Fly Ash Study**
- **Calendar of Events**

By Marta Charria

Proper compaction of hot mix asphalt (HMA) mixture is vital to ensuring that a stable and durable pavement is constructed. There are many factors that can affect the compaction of HMA such as gradation, environmental factors, placement in the field, etc.

This project evaluated the influence of lift thickness on the ability to achieve desirable in-place density levels. The study was conducted on different projects in the field. An experimental design was develop to evaluate how lift thickness will affect temperature, density and permeability.

A thick lift of HMA provides several benefits with respect to compactability. Thicker lifts will maintain more desirable compaction temperatures than thinner lifts. At the same time, a thicker lift will provide more room for aggregates to slide past each other, which makes easier to achieve density with a reasonable compactive effort.

It was recommended that MDOT adopt new requirements for allowable lift thicknesses for constructed HMA layers. This recommendation is based upon the increased density achieved with thicker layers, the increased time that thicker layers will maintain a desirable compaction temperature, the lack of influence on thickness-to-nomimal maximum aggregated size (NMAS) ratio on density gradients and the lack of influence of thickness-to NMAS ratio on permeability. For more information about this study contact Cindy Smith at 601.359.7648 or email at cjsmith@mdot.state.ms.us

Nuclear Gauge Measuring Density

MDOT Allowable Lift Thickness

	Single Lift Layer Thickness, Inch	
Mixture (NMAS)	Minimum	Maximum
25mm	3.00	4.00
19 mm	2.25	3.00
12.5 mm	1.50	2.00
9.5 mm	1.00	1.50
4.75 mm	0.50	0.75

Recommended Allowable Lift Thickness

	Single Lift Layer Thickness, Inch	
Mixture (NMAS)	Minimum	Maximum
25mm	3.00	4.00
19 mm	2.50	3.50
12.5 mm	1.50	2.50
9.5 mm	1.00	2.00
4.75 mm	0.50	1.25

Work Program

On September 3, 2009, the MDOT Research Division met with the MDOT Research Advisory Committee and FHWA to discuss and approve the budget for FY 2010. Ten new projects were added to the 80% / 20% program. The entire FY 2010 work program can be found at:
http://www.gomdot.com/Divisions/Highways/Resources/Research/pdf/Reports/WorkProgram/2010FY.pdf

State Study	Study Title	Start Date	Completion Date	Principal Investigator
221	Evaluation of MDOT's Distress Thresholds for Maintained Pavement Projects	10/01/2009	12/31/2011	Feng Wang
222	Best Practice of MDOT's Survey Operation, Organization & Technology Implementation	10/01/2009	06/30/2011	Tulio Sulbaran and Andrew Sltrelzoff
223	I-55 Integrated Diversion Traffic Management Benefit Study	10/01/2009	12/31/2011	Li Zhang
224	Summary of Lessons Learned from the MDOT MEPDG Materials Library Study	10/01/2009	06/30/10	Randy Ahlrich
225	Turbidity Monitoring at Select Construction Sites	10/01/2009	12/31/10	Bobby Mosely
226	Environmental Management Plan Development for MDOT Laboratories	10/01/2009	12/31/10	Bobby Mosely
227	Variability of Cement Treated Layers in MDOT Road Projects	10/01/2009	12/31/10	Robert Varner
228	Evaluating Alternative Mowing Regimen and the Use of Native Grasses & Wildflowers on Road Side Right-of-Ways	10/01/2009	12/31/12	John Guyton and Jeanne Jones
229	Instrumentation Computational Modeling for Evaluation of Bridge Substructures Across Waterways	10/01/2009	12/31/11	Wei Zheng
231	Optimizing Mississippi Aggregates for Concrete Bridge Decks	10/01/2009	06/30/11	Robert Varner

Pooled Fund Projects with 100% Federal Funding for FY 2010

Study Title	Sponsor
Accommodating Oversized/Overweight Vehicles at Roundabouts	Kansas DOT

Local Fly Ash Study

Research Division has recently completed field-work on a study evaluating the effectiveness of a locally produced fly ash for use in MDOT subgrade stabilization applications. The Red Hills power plant near Ackerman, Mississippi, produces a fly ash by-product that does not meet the ASTM specification for either Class C or F fly ash; however, this material has been successfully used by a local consultant to stabilize embankment material.

The MDOT Central Laboratory evaluated a lime fly ash (LFA) mix design using the Red Hills fly ash for application in a field test section. Using this mix design, a research test section was constructed at the Greene/George county line of the current Hwy 63four-lane project in District 6. From the test section, ten 4-inch diameter Proctor samples of field mixed Red Hills LFA material were fabricated, as well as ten 4-inch diameter Proctor samples from a field control soil cement stabilization test section. All Proctor samples were prepared and transported back to the Central Laboratory in their Proctor molds. The Red Hills LFA samples were extruded, cured, and tested under the same conditions as a typical LFA mix design. Analyses of these test results will allow evaluation of the Red Hills fly ash for use in MDOT stabilized soil applications as well as indicate the in-situ variability of this material in the road bed.

Research Division anticipates having the final report including all conclusions and recommendations ready and available next spring. For more information about this study, contact Jordan Whittington @ jswhittington@mdot.state.ms.us or 601-359-7637.

Spreading Fly Ash

Mixing FlyAsh

The making of lime fly ash samples

Calendar of Events		
October 4-6, 2009	FWD User's Group Meeting http://pms.nevadadot.com/upcoming.asp	Reno, NV
October 21-26, 2009	AASHTO 2009 http://www.transportation.org/	Palm Desert, CA
November 9-12, 2009	Southeastern Asphalt User/Producer Group (SEAUPG) Meeting http://seaupg.org/Pages/GenInfo_05.html	Hilton Head, SC
December 9-11, 2009	Road Profiler Users Group 2009 Meeting http://www.rpug.org/2009/intro.html	Atlanta, GA
January 10-14, 2009	Transportation Research Board 98th Annual Meeting http://trb.org/AnnualMeeting2010/Public/AnnualMeeting2010.aspx	Washington, DC

For more information, you can find us at

http://mdotweb/ under Research Division on the intranet site, or

http://gomdot.com/Home/Home.aspx under Research

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The Profiler

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