

State of Wisconsin/Department of Transportation
 RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: December 31, 2006

Program: SPR-0010(36) FFY99	Part: II Research and Development
Project Title: Testing Wisconsin Asphalt Mixtures for the AASHTO 2002 Mechanistic Design Procedure	Project ID: 0092-04-07
Administrative Contact: Nina McLawhorn	Sponsor: WisDOT/WHRP
WisDOT Technical Contact: Len Makowski	Approved Starting Date: 4/2/2004
Approved by COR/Steering Committee: \$125,000	Approved Ending Date: 02/02/2007
Project Investigator (agency & contact): Iowa State University, R. Christopher Williams, 482A Town Engineering Building, Ames IA 50011, Ph. 515-294-4419, Fax 515-294-7424	

Percent Complete:

At the conclusion of this quarter ISU is approximately 85% of the way completed with this project.

Project Description:

The Wisconsin Department of Transportation (WisDOT) currently uses the AASHTO 1972 Interim Guide for the Design of Pavement Structures for hot mix asphalt. This pavement design procedure is a strictly empirical pavement design approach, however with the latest research and available computer capabilities, mechanistic pavement design procedures have become more feasible. The AASHTO 2002 Guide for Design of New and Rehabilitated Pavement Structures and associated software has been built on the mechanical properties of the pavement layers while still using functions to predict pavement life, thus making it a mechanistic-empirical pavement design approach. This pavement design procedure also allows for default values of the mechanical properties to be used, which is based on previous measurements of these properties.

The intent of this project is to examine typical hot mix asphalt (HMA) pavements that are constructed in the state of Wisconsin. The analysis will compare the suggested pavement structures based on the current (1972) pavement design guide and that of the new (2002) pavement design guide. In order to develop the pavement structure as outlined by the AASHTO 2002 Pavement Design Guide the mechanical properties of the HMA layers must be measured. These properties include Dynamic Modulus and Flow Number, which have been found to be significant predictors of rutting and fatigue by Witczak et. al. (2002). Properties of the other layers in the system have been obtained from the WisDOT pavement design inputs.

A cross-section of typical HMA pavements has been formulated into a research project matrix, for the greatest benefit for the WisDOT. Iowa State University (ISU) will sample these mixtures during the 2004 paving season. These mixtures will then tested in accordance with the AASHTO 2002 Design Guide for the aforementioned testing procedures and compiled into a library of values for the WisDOT.

Progress This Quarter:

Literature Review:

The literature review has been continually updated as new research has/is being published from this years' TRB, AAPT, and ASTM publications.

Currently this portion of the project is 100% complete.

Laboratory Testing:

Nineteen of the nineteen jobs that have been sampled have been compacted; sawed/cored, and tested to data.

Currently this portion of the project is 100% complete.

AASHTO Design Guide Simulation:

ISU has nearly completed the simulations on all of the hot mix asphalt mixtures that have been tested. These jobs include an E-0.3, E-1, E-3, and E-10 trafficking levels. Information for the flexible pavements have been furnished by Laura Fenley of WisDOT, however, several assumptions had to be made in the analysis process. These assumptions include hourly traffic distributions, subgrade modulus, subgrade physical properties, etc. The AASHTO Pavement Design Guide software was found to be rather problematic at times, especially for composite pavements and at the current time ISU is trying to resolve these issues through discussions with Ed Harrigan at FHWA. What the preliminary results are showing from the simulations is that the current pavement thicknesses that are being stipulated by WisDOT may be ¼ to ½” under designed for the flexible pavement layers, but does require further analysis.

Currently this portion of the project is 98% complete.

Development of Library of Values:

As the testing data from the dynamic modulus and flow number tests becomes available it is being inputted into the Microsoft Access database that has been created for this project.

Currently this portion of the project is 100% complete.

Meetings:

No project meetings were held this quarter.

Work Next Quarter:

The research team anticipates completing the Microsoft Access database and the draft final report for TOC review.

Circumstances Affecting Progress/Budget:

There are no circumstances affecting the project progress/budget.

Gantt Chart:

ID	Task Name	% Complete	2004				2005				2006			
			Jan	Apr	July	Oct	Jan	Apr	July	Oct	Jan	Apr	July	Oct
1	Literature Review	100	██████████											
2	Dev. Of Research Plan & Materials Collection	100	██████████											
3	Laboratory Testing of Specimens	100	██████████											
4	Analysis of Laboratory Data	100	██████████											
5	Interim Report	100	██████████											
6	AASHTO Design Guide Simulation	98	██████████											
7	Development of Library of Values	100	██████████											
8	Final Report	85	██████████											

Move Contract from MTU to ISU