



WHRP

Wisconsin Department of Transportation Wisconsin Highway Research Program

Request for Proposal

Field Aging and Moisture Sensitivity Study

Questions submitted to research@dot.wi.gov regarding the content of this RFP are due no later than 4:30 PM (CST) on December 7, 2015

Responses to questions will be posted to the WisDOT Research and Library website <http://wisdotresearch.wi.gov/rfps-and-proposals> by 4:30 PM (CST) on December 14, 2015

Proposers must submit a PDF version of their proposal by 4:30 PM (CST) on January 22, 2016
to: research@dot.wi.gov

Proposers will be notified by May 1, 2016

For more information regarding this RFP contact the WisDOT Research Program at: research@dot.wi.gov. This RFP is posted to the Internet at: <http://wisdotresearch.wi.gov/rfps-and-proposals>.



**Wisconsin Highway Research Program
Request for Proposals
Flexible Pavement Technical Oversight Committee**

Field Aging and Moisture Sensitivity Study

I. Background and Problem Statement

Wisconsin DOT is currently studying how the use of performance-based technologies may impact the asphalt mixture design process. A factor in testing the performance of these mixes is getting a better understanding of how aging of the mixture during production and under environmental conditions impacts performance. Recent pilot projects on the use of recycled materials have called into question the current process for aging mixtures prior to testing. There are several methodologies currently being used in the country. Some of these look at aging compacted samples for long periods of time, while others use a loose mix aging process with a much shorter window. The difficulty is to find which type of aging may be more representative of the type of aging asphalt mixtures face during production and placement, and also when exposed to the effects of weather and climate for several years.

A secondary issue that has been identified as part of recent pilot projects is the moisture sensitivity of mixtures being produced in Wisconsin. The Hamburg Wheel test can indicate the sensitivity of a mix to stripping and even rutting to some extent. Recent testing by WisDOT has shown that finer graded surface mixes are not performing well in this test, even though performance in the field would indicate otherwise, with a low history of stripping and rutting problems. In order for WisDOT to accept this test as a future performance test for stripping, a better correlation of these test results with the performance we are seeing in the field is needed.

II. Objectives

- Develop laboratory-aging protocols through comparing mechanical mixture and recovered binder properties of laboratory conditioned and plant produced mixes.
- Evaluate the effects of binder grade, binder content, and mixture traffic level on laboratory measured and in-service performance properties.
- Define Hamburg Wheel Tracking Test requirements for laboratory and plant produced mixes inclusive of test temperature, specification criteria, sample conditioning, and reheat corrections. The intent of the aging protocol is for lab and plant produced mixes to produce similar test results.
- Oversee the construction of the field test strips, collect samples, and review the performance of the project after one winter.



III. Scope of Work

The study will focus on surface mixtures. At a minimum, the researcher shall:

- Develop a work plan for a test strip, split into ½ mile sections to represent different combinations of factors in the experiment. *Please Note, WisDOT will need to be part of the process to identify a project and include construction of the test section as part of a construction contract.*
- The proposal should state the required total length of the project and the expected length of the test section(s).
- Explain knowledge of recent and ongoing WisDOT research and pilot projects.
- Provide a detailed work plan and communication with both selected contractor and WisDOT staff.
- Develop experimental plan that includes selection of performance tests, conditioning protocols, etc. Factors to consider at a minimum when developing the work plan should include:
 - Asphalt Binder Type
 - Please define different grades and modification levels to be included in the work plan as defined in AASHTO M332
 - Asphalt Binder Content
 - Mix Traffic Level
 - Recycled Asphalt Material Content
 - Number of aggregate sources
 - Additives: Anti-strip, softening agents, etc.
 - Timing of mixture sampling.
 - Details of the work plan must be agreed to by WisDOT in advance of selection of the project.
- Collect plant-produced materials and recreate contractor mix designs of the material placed in the field. Produce sufficient samples to include performance tests at multiple aging conditions.
- Analyze data to (1) reconcile laboratory and plant aging, and (2) analyze effects of experimental factors on performance.
- Conduct one detailed pavement condition survey the spring after the first year of construction.

IV. Required Testing

- Moisture Damage Resistance and Stability – Hamburg Wheel Tracking Test (AASHTO T-324). Currently, WisDOT is using T-283, but the researcher should use the T-324 methodology for this project.
 - Option 1: Hold test temp at 50C and change passes/SIP (State Implementation Plan) criteria based on binder grade.
 - Option 2: Maintain performance limit and adjust test temperature based on binder grade.
 - Limits should include rut depth and SIP.



Other Tests for Consideration:

- Rutting resistance
- Intermediate and Low Temperature Cracking Resistance (ASTM D7313 or other)
- Other testing proposed by the researcher.

Requirements for Laboratory/Technician Certifications: HTCP AGGTEC 1 and HMA IPT at a minimum.

V. WisDOT/TOC Contribution:

- WisDOT will identify a project in the State of Wisconsin to construct the test strip for the researcher to monitor.
 - The project will be constructed sometime in 2017.
 - The variables of the researchers work plan will be included in a contract by special provision.
 - The research team will have to work within the contractor's traffic control, and follow all directed safety procedures required of the contractor.
- Any traffic control, if needed, will be the responsibility of the researcher to coordinate with existing construction contractors and WisDOT personnel.
- Expected level by staff/TOC members: Maximum of 40 hours.
- WisDOT Equipment: It is not anticipated that any WisDOT equipment will be needed as part of this study. The research team will not assume the availability of WisDOT equipment in the proposal. If WisDOT or another entity donates equipment, a letter of commitment must be included in the proposal.

VI. Required Travel

This project will require travel for a meeting to finalize the work plan with the POC. This project will require the researcher to oversee the construction of the field test strips, collect samples, and review the performance of the project after one winter. Travel is also required to deliver the final presentation.

VII. Deliverables

- Submittal and reporting of progress as required by the WHRP and WisDOT
- Reporting Requirements. Seven (7) hard copies and an electronic copy of the final report delivered to WisDOT by the contract end date.



- Presentation Requirements. All projects require the Principal Investigator to give a closeout presentation after submittal of the draft final report.

VIII. Schedule and Budget

- Proposed Project Duration is **21 months** starting around October 1, 2016.
 - Deadline for submittal of draft final report is March 31, 2018.
 - Deadline for submittal of Final Report is June 30, 2018.
- Project Budget shall not exceed **\$150,000**.
- The researcher is expected to submit the draft final report with quality technical writing and proper grammar. It is acceptable to include a technical editor on the research team to ensure these requirements are met.
- Matching funds will not be considered in the proposal evaluation process.

IX. Implementation

This research project, at its conclusion, should provide the following, at a minimum:

- Recommended potential changes in mix design specifications.
- Recommended potential changes in mixture aging procedures.
- Recommended specification limits for researched testing methods as part of this contract.
- Impacts and language changes to the Facilities Development Manual, Standard Specifications, Construction and Materials Manual, and any other manuals that may be impacted.
- Draft special provision or standard special provision language, if needed.