Wisconsin Department of Transportation
Wisconsin Highway Research Program

Request for Proposal

Investigation of Tack Coat Materials on Tracking Performance

Questions submitted to research@dot.wi.gov regarding the content of this RFP are due no later than 4:30 PM (CST) on December 12, 2016

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 19, 2016

Proposers must submit a PDF version of their proposal by 4:30 PM (CST) on January 20, 2017 to: research@dot.wi.gov

Researchers will be notified of the proposal review decision by May 1, 2017

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  

*Investigation of Tack Coat Materials on Tracking Performance*

I. **Background and Problem Statement**

WisDOT is currently working towards specifications to modify the current process of using tack coats on projects. The application rate was increased from 0.025 gal/sq yd to a range of 0.050 to 0.070 gal/sq yd in 2015 requiring that 50% of the residual material is asphalt. The concern within the past two construction seasons was not the application or dilution rate, but the ability of the in place material to remain in place during paving operations to achieve the anticipated/adequate bond strength. The research project is intended to evaluate the bond strength of different materials, techniques/practices, and new technologies while focusing on determining the optimum application rate and the time required to cure to prevent tracking. The research is also expected to develop recommendations for further specification changes with regard to tack maintenance and time of application in connection with this project scope.

II. **Objectives**

The objective of the study will be to make recommendations regarding tack coat specifications. To address the objective of the study, the following items must be addressed:

- Determine the proper timeliness of tack coat application (keeping in mind limited paving times due to project scope and lane closure restrictions).
- Evaluate different tack coat materials to determine what product should be used based on weather conditions/construction type/construction staging/etc.
- Assess different techniques, innovations, technologies, etc. to operate more effectively and efficiently than the current standard practice.

III. **Scope of Work**

**Task 1: Synthesis of Current Practices and Research**

Perform a comprehensive literature review and develop an initial assessment of tack coat recommendations based on current practices on a national level. The assessment should include, but is not limited to:

- Synopsis of other cold weather states’ current specifications and recommendations regarding tack coat material types, application rates, etc.
Comprehensive synopsis of research on tack coats.

Summary and comparison of other cold weather states’ specifications for material testing, acceptance, verification, etc.

Summary of the latest technologies being utilized and determination of whether or not those technologies can be utilized in Wisconsin.

Key research studies to be considered:
- West et al. (2005) – NCAT Bond Strength Device (20 psi normal)
- McGhee and Clark (2009) – VDOT Shear Device
- Kim et al. (2011) – Layer Parallel Direct Shear
- Tran et al. (2012) – Florida DOT Shear Test
- Mohammad et al. (2012) – Louisiana Interlayer Shear Strength Tester (LISST) (100 psi normal)

Task 2: Work Plan Development
Based on the identified state of practice and new advances develop a Work Plan for a laboratory testing program to determine the adequate strength needed between layers of hot mix asphalt to ensure the layers are bonded. The Work Plan should address optimum application rate and time to cure instead of just bond strength so tracking is targeted.

Factors to consider at a minimum when developing the Work Plan should include:
- Tests and assessment of:
  - Asphalt Binder Type (modified vs. unmodified)
  - Mix Type (NMAS compatibility)
  - Type of construction
  - Mix Traffic Level
  - Recycled Asphalt Material Content
  - Aggregate sources
  - Additives: Anti-strip, softening agents, warm mixes, etc.
- Collection of tack coat materials placed in the field from the distributors per WisDOT standard, and test according to current WisDOT requirements.
- Development of an assessment methodology to evaluate the bond strength of cores taken on different pavement types (overlays, milled surfaces, PCC milled surfaces, PCC overlay) using current requirements.

Please note, WisDOT will provide cores from pilot projects constructed in 2017. WisDOT will need to be part of the process to identify projects for sampling and work with contractors to determine what practices are being utilized for Pilot projects. Pilot project scope would include up to 15 cores for analysis.

Task 3: Interim Presentation and Project Memorandum
Present findings from Task 1 and the proposed Work Plan to the Technical Oversight Committee (TOC) for feedback and approval.
Task 4: Execution of Work Plan and Analysis of Results
All materials testing will use standardized test methods (ASTM/AASHTO) or tests that have yet to be standardized but are accepted as current practice in the HMA community as agreed upon by the TOC.

Task 5: Final Report and Project Closeout Activities
Project Closeout Presentation: The researcher will present in person the final research findings and recommendations to the TOC. The TOC will supply/document any comments or concerns regarding the final product of the research.

Final Report: The researcher is expected to address or incorporate any TOC comments prior to delivery of the final report in WHRP formatting requirements.

IV. Required Testing
- Test emulsified asphalts according to AASHTO T59

The researcher team is expected to propose tests to measure bond strengths both in the lab and field. Include those tests in the RFP. Testing will be determined by the POC/TOC after the researcher is selected.

V. WisDOT/TOC Contribution:
- WisDOT will identify projects where material may be sampled. Materials and cores will be sampled by WisDOT during 2017 construction for use in the study.
- Expected level by WisDOT 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.
- Any traffic control, if needed, will be the responsibility of the researcher to coordinate with existing construction contractors and WisDOT personnel.

VI. Required Travel

This project may require travel to Madison, WI for a meeting to finalize the work plan with the POC as well as interim reporting. It is expected the PI will deliver the final presentation in person in Madison, WI.
VII. **Deliverables**

- **Draft Final Report:** The researcher is responsible for submitting a draft final report to the TOC. Conclusions and recommendations will specifically address WisDOT efforts to improve tack coat practices. Any changes to existing practice should be addressed using the aforementioned value-based approach in an effort to balance performance and cost.
- **Submittal and reporting of progress as required by the WHRP and WisDOT**
- **Reporting Requirements:** Six (6) 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**

A. **Project Budget shall not exceed $100,000.**
B. **Proposed project duration is 18 months starting around June 1, 2017.**
   - Deadline for submittal of draft final report is three months prior to contract end date to allow for report review activities.
   - Deadline for research close out presentation is 4-6 weeks prior to contract end date.
   - Deadline for submittal of the Final Report is the contract end date.
C. 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.
D. Matching funds will not be considered in the proposal evaluation process.

IX. **Implementation**

This research project, at its conclusion, should provide at a minimum the following items:
- **Recommended potential changes in standard specifications.**
- **Impacts and language changes to the Facilities Development Manual, Standard Specifications, Construction and Materials Manual, and any other manuals that may be affected.**
- **Draft special provision or standard special provision language, if needed.**