

# **REQUEST FOR PROPOSALS**

## **PAVEMENT SERVICE LIFE EXTENSION DUE TO ASPHALT SURFACE TREATMENT INTERLAYERS**

### **LTRC No. 16-5P, SIO No. DOTLT1000089**

#### **PROBLEM STATEMENT**

The Louisiana Department of Transportation and Development (DOTD) has been using asphalt surface treatment (AST) interlayers over soil cement base courses as a means to mitigate shrinkage cracks from reflecting through the overlying asphaltic concrete (AC) pavement. This practice varies amongst the DOTD Districts and there are currently no official DOTD guidelines or policies on this practice. Additionally, there have been no studies conducted to determine the cost effectiveness of AST interlayers and the service life extension of this practice is unknown as well.

The LADOTD mainframe computer has a wealth of information for pavement construction history and pavement inventory data. The mainframe is organized by project number, which is composed of nine digits. The first five represents the control section and the last four indicates the number of projects done on that control section over a period of time. Other information such as material types, layer thicknesses (base, subbase, and HMA or PCC surface), roadway geometry, traffic and other maintenance information can be found in the Material Testing System (MATT), Tracking of Projects (TOPS), Letting of Projects (LETS), the Highway NEEDS, the Traffic & Planning Highway Inventory, the Maintenance Operations System, and the Traffic Volumes data sections of the mainframe database.

For each pavement section in the road network, DOTD collects pavement distress data every two years, which are stored in the PMS database. The data are collected and sorted for each 1/10<sup>th</sup> of a mile section of a road. The distress data for all pavement sections (including fatigue cracking, longitudinal and transverse cracks, IRI, patching, and rutting) may be obtained. The data may be used to evaluate the performance of pavement sections with soil cement and soil cement with AST interlayers. It should be noted that DOTD uses two types of soil cement design processes: 150 psi unconfined compressive strength (USC) at 7 days and 300 psi USC at 7 days.

Pavement performance is typically quantified in terms of functional and structural distresses. Function distress parameters typically used by DOTD are transverse cracks, longitudinal cracks, block cracks and ride quality in terms of the International roughness index (IRI). Of these, transverse and block cracks can typically be attributed to shrinkage cracking in the soil cement base course. Structural related distresses are typically attributed to parameters such as alligator cracking and patching. DOTD does not typically collect structural data with devices such as a falling weight deflectometer (FWD). All of the parameters previously listed with the exception of FWD data, will be made available to the researcher from the DOTD Pavement Management Systems database.

DOTD defines the remaining service life (RSL) of a pavement section as the estimated/predicted number of years of service from any given date (usually from the last distress survey date) to the

time when the pavement section is expected to accumulate distress points equal to the threshold value. The maximum value of the RSL is the design life of the last rehabilitation or construction and the minimum value of the RSL is zero. Negative RSL should not be assigned to any pavement regardless of its condition. For a newly designed and constructed or rehabilitated pavement section, the RSL is equal to the design life and the pavement or rehabilitation action. Finally, the service life (SL) of a pavement section is the actual number of years that the pavement is expected to serve the traveling public between construction and rehabilitation or between two consequent rehabilitation activities. Hence, the SL of any pavement section is equal to the sum of its surface age (SA) and RSL.

## **OBJECTIVES**

The project objectives are to evaluate DOTD's current AST interlayer practice over soil cement base courses to determine its effectiveness, associated costs/benefits, and develop guidelines/policies for the use of AST interlayers.

## **RESEARCH APPROACH**

The Louisiana Transportation Research Center (LTRC) is seeking the insight of proposers on how best to achieve the research objectives. Proposers are expected to describe research plans that can be realistically accomplished within the constraints of available funds and contract time as allowed in this RFP. Proposals must present the candidate's current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach. Task descriptions are intended to provide a framework for conducting the research. The proposal shall address at a minimum, the following tasks:

### ***Task 1 – Review of Literature and State-of-the-Practice***

Conduct a comprehensive examination and review of existing literature regarding the state-of-the-practice in the USA for the design, construction and quality control of AST interlayers. Previous and on-going research projects and case studies will thoroughly be reviewed and summarized. This will be accomplished by reviewing National Cooperative Highway Research Program (NCHRP) synthesis reports, Federal Highway Administration (FHWA) research studies, National Highway Institute (NHI) courses, and journal and conference publications.

### ***Task 2 – Review of LA DOTD State-of-the-Practice***

Conduct a comprehensive survey of the state-of-the-practice of each district within DOTD. The results of survey will determine the decision processes which are utilized to determine when AST interlayers have historically been used as well as identify which projects they have been used on. The survey should include but not limited to project scoping, costs, anticipated benefits, and pavement conditions. The survey will be submitted to the PRC for approval prior to distribution. LTRC will assist in the distribution of the survey.

### ***Task 3 – Roadway Identification for Project Selection***

Identify roadways with soil cement base courses with and without AST interlayers. Researchers shall identify appropriate methods and data sources to be utilized in the research to develop an appropriate statistical analysis.

#### ***Task 4 – Remaining Service life and Service life computations***

Develop performance curves for all appropriate distresses with and without AST interlayers. The performance curves will be plotted with age versus the distress parameters for both the cement treated and cement stabilized designs. As available data permits, the researchers will be required to compute the RSL and SL for each parameter previously mentioned. Examples of how to perform these computations may be found in *LTRC Report Number 460 “Development of Index Based Pavement Performance Models for Pavement Management System (PMS) of LADOTD”* located at [http://www.ltrc.lsu.edu/pubs\\_final\\_reports\\_5.html](http://www.ltrc.lsu.edu/pubs_final_reports_5.html).

#### ***Task 5 – Cost benefits analysis***

Conduct a cost-benefit analysis on the use of AST interlayers over soil cement base courses. The CBA ratios will be tabulated as appropriate for each parameter.

#### ***Task 6 – Guide Document***

Develop a guide document detailing the appropriate use of AST interlayers on future projects based on parameters such as the remaining service life, service life, and cost benefits analysis.

#### ***Task 7 – Final Report, Recommendations, and Implementation Plan***

The research team will prepare a final report to document the entire research effort along with a two page technical summary. The final report should include all the data, results, and recommendations generated by this study. The implementation plan is a separate document that describes how the department should enact the recommendations within the specifications, and policies of the DOTD.

### **DELIVERABLES**

The proposal shall include project deliverables for appropriate tasks. Deliverables shall be due as defined in the proposal. The proposal shall include at a minimum the following deliverables:

- Review of literature and state-of-practice (Task 1)
- Review of DOTD state-of-practice (Task 2)
- Roadway identification for project selection (Task 3)
- Remaining Service Life and Service Life computations (Task 4)
- Cost benefits analysis (Task 5)
- Guide Document (Task 6)
- Final Report, Recommendations, and Implementation Plan (Task 7)

### **SPECIAL NOTES**

- A. LTRC research projects will be conducted in accordance with the LTRC Manual of Research Procedures, 2003 edition. ([http://www.ltrc.lsu.edu/pdf/research\\_man03.pdf](http://www.ltrc.lsu.edu/pdf/research_man03.pdf))
- B. Any work that is anticipated to be required from LTRC or DOTD forces shall be specifically detailed in the proposal.
- C. LTRC projects are intended to produce results that will be applied in practice. It is expected that the implementation of the results of this research into practice will evolve as a concerted effort during this project. The final report must contain an implementation plan to include, as a minimum, the following:
  - a. The “product” expected from the research;

- b. A realistic assessment of impediments to successful implementation;
  - c. The activities necessary for successful implementation; and
  - d. The criteria for judging the progress and consequences of implementation.
- D. To assist in the implementation process, the investigators of this research shall present the final results to LA DOTD officials in an oral presentation to be held in Baton Rouge, Louisiana at LA DOTD Headquarters after acceptance of the final report.
- E. The proposal should include travel to meet with the Project Review Committee for a “kick off” meeting, and presentation of the final report at a minimum. Funds budgeted for travel shall be limited to what is necessary for the conduct of the research. Funds shall not be budgeted for conference travel. Funding for technology transfer of research results is available upon request subject to LTRC approval and available funds.
- F. Graduate assistance stipends are allowed. Tuition reimbursement or tuition remission rates applied to stipends are not allowed.
- G. Questions regarding this RFP should be submitted in writing to the LTRC contact person. Questions must be received by close of business seven calendar days prior to deadline date.
- H. To equitably answer any questions regarding this Request for Proposals, the Louisiana Department of Transportation and Development (LA DOTD) website will be updated with questions and answers and related documents regarding the project.

<http://webmail.dotd.louisiana.gov/agrestat.nsf/WebAdvertisements?OpenPage>

LA DOTD makes these documents available for informational purposes only to aid in the efficient dissemination of information to interested parties. LA DOTD does not warrant the documents against deficiencies of any kind. The data contained within this web site will be periodically updated. Interested parties are responsible to be aware of any updates. Questions regarding this RFP should be submitted in writing to the LTRC contact person. Questions must be received by close of business seven calendar days prior to deadline date.

- I. Consultants and business entities shall be registered with the Secretary of State in order to be able to work in Louisiana prior to award of contract.  
<http://www.sos.la.gov/tabid/1011/Default.aspx>
- J. If Sub-Consultants/Entities are used, the Prime Consultant/Entity must perform a minimum of 51% of the work for the overall project.
- K. LTRC reserves the right to withhold invoice payments for delinquent deliverables as defined in the proposal.

#### **ESTIMATE COST OF RESEARCH**

The estimated cost of this research is \$200,000, which includes the satisfactory completion of the recommended tasks outlined herein and any additional tasks added by the researcher to meet the research objectives. Itemized project costs shall be sufficiently justified as required in the LTRC Manual of Research Procedures.

#### **ESTIMATED COMPLETION TIME**

21 Months (*includes 3 months for review and approval of final report - i.e. draft final report due in 18 months*)

## **LTRC PRIMARY CONTACT**

Kevin Gaspard, P.E.  
Pavement Research Manager  
Phone: (225) 767-9104  
e-mail: kevin.gaspard@la.gov

## **AUTHORIZATION TO BEGIN WORK**

February 1, 2016 (Estimated)

## **PROPOSAL FORMAT**

All proposals are required to be formatted according to LTRC Manual of Research Procedures available on the web site: <http://www.ltrc.lsu.edu/research.html>. Chapter 2 of that manual provides guidance on proposal development.

## **PROPOSAL SELECTION**

The Project Review Committee selected for this project will review, evaluate, and rank all proposals received using the criteria established on the attached proposal review form.

## **DEADLINE FOR RECEIPT OF PROPOSALS**

Ten copies of the proposal must be received by LTRC by the close of business **January 8, 2016.**  
Proposals to be submitted to:

Mr. Harold Paul, Director  
Louisiana Transportation Research Center  
4101 Gourrier Ave.  
Baton Rouge, LA 7080