

*Missouri
Department
of Transportation*



Henry Hungerbeeler, Director

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September 16, 2003

Dear Consultant:

The Missouri Highways and Transportation Commission is requesting the services of a consulting engineering firm to perform the described professional services on the attached request for proposals (RFP).

If your firm would like to be considered for these consulting services, you may express your interest by responding as described in the RFP.

All proposals must be received by 12:00 pm, October 3, 2003.

Sincerely,

Dave Nichols
Director of Project Development

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Attachment

Copies: Ray Purvis-rd
Don Hillis-op
Ms. Sharon Taegel-ig

MODOT REQUEST FOR PROPOSALS

CONSULTANT SERVICES FOR THE AASHTO MECHANISTIC-EMPIRICAL PAVEMENT DESIGN MODEL CALIBRATION AND IMPLEMENTATION

Introduction

The Missouri Department of Transportation (MoDOT) has always relied on sound engineering for designing new and rehabilitated pavements. The current design method is based on the long-standing empirical AASHTO Guide for Design of Pavement Structures. Most other States have also adopted a version of this Guide. The Guide has served Missouri well for many years, but is in the process of being replaced by a mechanistic-empirical (M-E) model. This model represents the most dramatic change to pavement design methodology in over forty years. It is the intent of MoDOT to adopt the new AASHTO M-E design model for future rehabilitation and construction of pavements.

Purpose

The holder of this professional services contract will guide and assist MoDOT through the AASHTO M-E model validation and calibration process. The pavement design model will be used primarily for National Highway System (NHS) and remaining arterial routes.

General Conditions

It is anticipated this professional services contract will cover a period of one year with the possibility for renewal based on MoDOT's need for additional services, availability of funding, and the Consultant's performance. The Consultant will work closely with MoDOT pavement design specialists during completion of the tasks. All existing traffic monitoring databases, pavement performance history databases, as-built material documentation, and any other existing pertinent information will be made available to the Consultant. All laboratory material testing required by the Consultant to complete the characterization tasks will be performed by MoDOT personnel at their Central Lab facilities or by a selected materials testing contractor. All pavement performance field testing required by the Consultant to complete the characterization tasks will be performed by MoDOT personnel.

This Request for Proposal (RFP) is not a contract. MoDOT reserves the right to delete or amend existing provisions, or include additional provisions not addressed herein prior to the submittal due date. If it becomes necessary to revise any part of the RFP, an addendum shall be provided. All Proposers shall acknowledge all of the addenda as part of their Proposal.

Instructions for Submittal of Proposals

All interested companies or institutions should indicate their interest as soon as possible by sending an email to donahj@mail.modot.state.mo.us. The subject line of this email should be "Distribution list for the AASHTO M-E Pavement Design Model Calibration and Implementation RFP". The body of the email should contain only the contact information for the company including the company or institution name and the name, address, phone number, fax number, and email address for a single contact person. A reply will be returned indicating that the email has been received. These emails will be used to create a distribution list for the purpose of emailing responses to all inquiries directly to all parties on the list.

All proposals must be submitted to:

Mr. John Donahue, P.E.
Research and Development Engineer
Missouri Department of Transportation
1617 Missouri Blvd.
Jefferson City, MO 65109

All Proposals must be received by 12:00 p.m. on October 3, 2003. No Proposals will be accepted after the time specified. MoDOT reserves the right to reject any and all Proposals based on non-compliance with the RFP. All materials submitted in accordance with this RFP become the property of MoDOT and shall not be returned.

Inquiries

All inquiries concerning this RFP should be sent to:

Mr. John Donahue, P.E.
Research and Development Engineer
Missouri Department of Transportation
1617 Missouri Blvd.
Jefferson City, MO 65109
Or
Fax to the attention of John Donahue at ((573) 526-4324
Or
E-mail to Mr. Donahue at donahj@mail.modot.state.mo.us

Proposal Format

Each submittal shall consist of three (3) bound copies of the proposal package.

The Proposal shall include the following sections:

Project Team

This section shall contain information for individuals that will participate in the work. A description of the role each project member will assume in the work shall be included. Individual information must include name, title, educational background, professional registration or certification, and past work experience (and dates) applicable to this project.

This section shall also detail the availability of each staff member based on percentage of time he or she will have to devote solely to this project, taking into consideration his or her other project commitments.

Previous Experience of Company or Institution

This section shall detail the Proposer's previous experience related to this type of work. Include a listing of all work relating to M-E pavement design model development and calibration. This listing shall include a description of the work, the approximate start date and the date the work was completed, and project budget. Also include the names of any persons who worked on the prior project who are proposed to work on this project, and the role they played in the previous work.

Scope of Services

This section shall contain a statement of the objectives of the work to be performed under this contract and the Proposer's overall approach to accomplishing these objectives. The statement shall be followed by a detailed, comprehensive plan for completing the project based on the Scope of Work in this RFP. Specific information regarding how the Proposer will address each task should be provided. The plan for completing the work shall include a description of the project team with responsibilities assigned for each task, as well as information regarding the resources proposed to accomplish the work.

Resource Allocation Information

This section shall contain resource allocation information for all tasks identified in this RFP. It shall provide the number of hours required to complete each scope of work task and shall be subdivided by job titles or classifications. No cost figures are to be submitted as part of the proposal; all project costs will be negotiated with the successful Consultant at a later date.

Appendix

This section may include more detailed resumes for the project team and any other items which were not specifically requested, but which may be pertinent to the work, and useful to MoDOT in evaluating the Proposer's capability to perform satisfactorily.

Scope of Work

The Consultant shall assist MoDOT with the following tasks to complete the M-E model calibration process:

Task 1

Work Plan

A work plan will be developed which details implementation of the following tasks as well as the resources and time frames required to carry them out.

Task 2

Laboratory and Field Testing

Recommendations for the sophistication level of various materials characterization inputs required in the M-E model will be made. Based on these input levels a laboratory and field testing plan will be developed for the necessary materials characterizations of Missouri pavement types. The results of testing will be evaluated. Final values for materials characterization inputs and defaults will be determined.

Task 3

Traffic Estimation Procedures

Recommendations for the sophistication level of traffic and load spectra inputs required in the M-E model will be made. Current traffic data collection efforts will be reviewed for adequacy to complete the inputs. Based on the selected input levels a data sampling plan for various functional and traffic classification roadways will be developed to generate default values in the traffic module.

Task 4

Pavement Section Sampling

A statistically significant sampling of Missouri pavements will be selected to validate AASHTO M-E model predictions by pavement type. In Missouri, predominant new pavement types are jointed plain concrete pavements (JPCP) and conventional hot mix asphalt (HMA) pavements, while predominant rehabilitation pavement types are unbonded concrete overlays or HMA overlays on jointed reinforced concrete pavements (JRCP) and HMA overlays on conventional HMA or plant mix pavements. Performance data will be collected for the selected sections and categorized by design types, materials, and traffic ranges.

Task 5

Validation of M-E Model

Inputs generated from Tasks (2) and (3) will be used in AASHTO M-E model runs for the pavement types chosen in Task (4). Actual pavement performance will be compared to M-E model prediction results. Comparison results will determine areas of weak correlation that require Missouri-condition calibration.

Task 6

Calibration of M-E Models

Actual performance data will be used to adjust distress model coefficients so that the models can predict pavement performance with reasonable accuracy. New calibration coefficients will be programmed into the AASHTO M-E model.

Task 7

Design Sensitivity Analysis

Using the AASHTO M-E model calibrated for Missouri conditions a complete sensitivity analysis for every pavement type will be generated in graphical format for realistic ranges of inputs.

Task 8

Input Database Library

The AASHTO M-E program database library will be customized with complete materials and traffic default information for various functional roadway and pavement design types in Missouri.

Task 9

Final Design Report

A design manual will be created containing comprehensive instructions for running the AASHTO M-E program. It will include explanations for selecting the various climate, materials, and traffic inputs required for different pavement types and functional classifications and understanding the performance prediction results as they pertain to meeting minimum design life requirements.