

October 10, 2023

Dear Research Partner:

The Missouri Highways and Transportation Commission requests proposals from qualified organizations—namely private consultants, universities, and research organizations—to furnish professional services as described in the following request for proposal to be coordinated by the Research Unit of the Construction and Materials Division.

Please submit a proposal for project **TR202406** entitled, **“Using Rubber Powder to Improve Freeze/Thaw Resistance of Concrete.”** Your submittal must include a work plan, the proposed project team and its background, and any related projects now active or recently completed by your firm. The project team must be led by a licensed professional engineer in the state of Missouri and the final report must be sealed, in accordance with the provisions of Chapter 327 RSMo.

The selection committee will use Qualification Based Selection. A “not to exceed” budget amount is included in the RFP to assist with the required scope, but budgets are not to be included with the proposal submissions and will not be presented to the selection committee.

Please submit all proposals to MoDOTResearchRFP@modot.mo.gov by **November 30, 2023 10:00 AM (CST)**. More information about project contracting in general can be found at <https://www.modot.org/information-researchers> under RFP documents.

Sincerely,



Jen Harper
Research Director



Background

Air-Entraining admixture (AEA) has been used in concrete mixtures for many years. The purpose of AEA is to develop microscopic air bubbles during the mixing process. These air bubbles will increase the freeze/thaw durability by providing microscopic chambers within the hardened concrete for water to travel to and from during the freeze/thaw cycles. Concrete mixtures often have supplementary cementitious materials (SCM) included in them; these SCM sometimes require continuous adjustments of AEA to control air content in the mix.

Recycled rubber is currently allowed to be incorporated into bituminous mixtures if the properties of these mixes meet specifications. By incorporating recycled rubber powder into concrete mixes in lieu of AEA, the rubber powder could act as the "air void structure" to allow for freeze/thaw of the hardened concrete without the need for continuous adjustments of the AEA when SCM is being added to mixtures.

Objectives

Traditional concrete mixes used in highway construction projects are required to have an air void structure to aide with the continuous freeze/thaw cycles during winter seasons. Current practice is to use an AEA which at times has its difficulties when it is used in conjunction with some SCMs.

The use of rubber powder in concrete is not a new idea but has not been greatly researched. The objective of this project would be to determine the rubber powder particle sizes and percentages for concrete mixes that could replace using AEM while not jeopardizing integrity of final product.

Project Requirements

Task 1: Project Management

The Research Team will facilitate a kick-off meeting with MoDOT to review the work plan, scope, schedule, and discuss the data management plan; and establish a protocol for regular ongoing (at a minimum monthly) communications and coordination with the team. The Research Team will schedule and conduct quarterly project status meetings to review progress for the previous period and anticipated work for the next period. The Research Team will also develop minutes for the kick-off meeting and any other status meetings that may be held during the project. The finalized work plan will detail implementation of the following tasks as well as the resources and schedule to carry them out.

Task 2: Literature Search

The Research Team will perform a literature search for current and past research related to rubber powder used in concrete mixtures along with any environmental or health concerns, any compatibility issues with admixtures or SCM's with its use. Determine cost difference between AEA and rubber powder and availability of the rubber powder. Research test methods for verifying mixtures have appropriate amounts of rubber powder to achieve freeze/thaw durability during production. The literature review should discuss the mechanism of how the rubber powder protects concrete from freeze/thaw damage.

Task 3: Presentation and Recommendation of Findings in Literature Search

The Research Team will compile findings of the literature search, present findings, and provide feedback or recommendations to MoDOT. MoDOT will make decision to move forward with research if findings are feasible.

Task 4: Mix Designs and Testing

The Research Team will design and perform testing of mixes incorporating different percentages and sizes of rubber powder to determine best combination. Mix designs will be shared and approved by MoDOT prior to mixing and testing. Testing will include but is not limited to: air, slump, compressive strength, flexural strength, static modulus, scaling, permeability, and freeze/thaw durability.

Task 5: Draft Report and Research Summary

The Research Team will develop and submit a draft report with an implementation strategy and research summary for MoDOT's review.

Task 6: Final Report, Research Summary and Presentation

The Research Team will submit a final report with an implementation strategy and research summary of the research and data collected along with a final presentation.

Project Deliverables

For templates and forms for reports and plans, visit <https://www.modot.org/information-researchers>.

Email Communications

E-mail and phone communications between the Principal Investigator(s) and MoDOT contacts as necessary are required to provide on-going updates of progress throughout the project.

Data Management Plan

The plan is a formal document that describes the data that is acquired, created, or produced during the project, specifies who owns it and who can access it as well as information on how it will be described, managed, analyzed, stored, shared, and preserved during and after the project is over. Please refer to templates on the [website](#).

Quarterly Reports

Quarterly reports should be submitted throughout the project on the last day of March, June, September, and December. The quarterly reports are not intended to replace any additional correspondence between the research team and MoDOT needed to keep the project moving. Please refer to template on the [website](#).

Interim Presentation

An interim presentation shall be scheduled near the mid-point of the project to update MoDOT on the progress and the direction of the project. The purpose of the interim presentation is to evaluate the progress and determine if any mid-project corrections are necessary.

Draft Final Report and Research Summary

These drafts should be final products except for revisions based on MoDOT's review. A final report must include a completed Technical Report Documentation page. Please refer to **Publication Guidelines** and summary template on the [website](#).

Final Report and Final Research Summary

After MoDOT's review is complete and documents have been edited to MoDOT's satisfaction, final documents should be submitted as a Word documents (unless otherwise instructed). Please refer to **Publication Guidelines** and summary template on the [website](#).

Other Deliverables

Examples include construction reports, interim reports, annual reports, maps, brochures, Include descriptions, criteria, and frequency.

Final Presentation

May be required. The Contractor will present the results, recommendations, and implementation ideas to MoDOT and other stakeholders. The Contractor will coordinate location, date, and meeting fees with MoDOT. For stakeholder and agency participants, any travel and lodging fees are to be covered by individual attendees or their firms. MoDOT and stakeholders will provide feedback to the contractor, especially related to implementation.

Task-Specific Deliverables

Task	Deliverables
1	Schedule and conduct kickoff meeting. Submit work plan. Kickoff meeting minutes.
2	Literature search.
3	Present literature findings and recommendations to MoDOT.
4	Present mix designs to MoDOT for approval. Perform testing of mixes.
5	Draft final report, draft research summary.
6	Final report, final research summary and presentation.

Project Schedule

The following is an estimate of the project timeline or information on key dates within the project, presuming the project starts **January 15, 2024**. Proposals need to include a work plan with a proposed timeline. For a sample of a work plan template, see link below. Changes to our estimated project timeline below will be considered, however, timeline extensions cannot be guaranteed. If the Contractor believes the project can be completed sooner, please include a revised schedule with the proposal. The project timeline will be discussed and finalized during the kickoff meeting.

For report templates and forms, visit <https://www.modot.org/information-researchers>.

Date	Milestone
1/29/2024	A kick-off meeting with MoDOT will be scheduled to discuss project requirements and deliverables. The dates of key milestones and deliverables will be determined from this meeting.
5/15/2024	Presentation and recommendation of findings from Literature Search.
7/15/2024	Presentation of mix designs for MoDOT approval.
1/15/2025	Interim presentation must be done by this date.
10/15/2025	Draft final report, draft summary report are due. The draft documents shall be submitted to MoDOT approximately two months prior to the final report.
12/15/2025	Final report, summary report, and final presentations are due. The final documents shall be due approximately one month before the end of the contract. This is to allow all billing to be completed prior to the end of the project.
1/15/2026	Final invoice due.
1/15/2026	Contract ends.

Special Notes

Project budget is not to exceed **\$180,000**. A budget is not to be included in the proposal, but will be required for the contract and must be within this limit. For a sample Budget template, report templates and forms, see <https://www.modot.org/information-researchers>.

All questions, information, data and/or manual requests regarding any aspect of the RFP details or process for submissions should be submitted to MoDOTResearchRFP@modot.mo.gov by the date and time listed in the "RFP Schedule" section of the RFP. This is the only acceptable method for contact regarding the RFP and contacting MoDOT employees via other methods is prohibited. Not adhering to this rule is cause for disqualification of the proposal.

RFP Requirements

- “Contracting Documents” provide further details and links to the required forms. They are available at <https://www.modot.org/information-researchers>.
 - **Contractor’s Project Experience:** The proposal must clearly identify the Organization’s experience in offering the services requested in this RFP during the past three (3) years. The description should include a list of the agencies which your organization has served during this time period or currently serves. Please highlight any work you have done with other state agencies or local governments.
 - **Team Member Experience:** Please list all team members (including subcontractors) proposed to work on the project. Attach licenses, certifications and resumes for key personnel.
 - **Contractor’s Client References:** Proposals should indicate the name, title, and telephone number of at least three clients within the past three years.
- Proposals must be no more than 10 pages in length with a font size no less than 11 points. This length limit **does not include** the Proposal Submission Form, Contractor’s Project Experience, Team Member Experience, Contractor’s Client References and optional cover letter (if included, one page maximum).
- Proposals must be submitted as one combined PDF document. The submission should **only include the required documents** organized in the following order: 1) Proposal Submission Form; 2) Cover Letter (Optional; 1 page maximum); 3) Body of Proposal (including work plan and project schedule); 4) Contractor’s Project Experience; 5) Team Member Experience; and 6) Contractor’s Client References.
- The Offeror must respond to this RFP by submitting all the information required herein for its proposal to be evaluated and considered for award. Failure to submit all the required information shall be deemed sufficient cause for disqualification of a proposal from consideration.
- Proposals will be evaluated by an agency and stakeholder team with knowledge and backgrounds in relevant areas for this project. Selection of the successful Contractor will be based on the Contractor’s demonstrated knowledge in the required areas, the merit of the proposed methods and approach in achieving the desired goals, the experience and qualifications of the team, the plan for ensuring implementation of results, and the adequacy and availability of team members to complete the work in a timely manner.
 - Correct proposal submission is one of the evaluation criteria. If submission instructions in this section are not followed, the Contractor **risks an automatic 10-point deduction (out of 100 total points)** when points are awarded during the Proposal Evaluation Process.

RFP Schedule

This document constitutes an RFP from qualified organizations to conduct the **TR202406: Using Rubber Powder to Improve Freeze/Thaw Durability of Concrete** study for the MHTC and Missouri Department of Transportation (MoDOT). MHTC reserves the right to reject any and all proposals for any reason whatsoever.

The following RFP Schedule of Events represents MoDOT’s best estimate of the schedule that shall be followed. The time of day for the following events shall be between 7:30 am and 4:00 pm, Central Time unless otherwise noted. MoDOT reserves the right at its sole discretion to expand this schedule, as it deems necessary, without any notification except for the deadline date for submitting a proposal. Time is of the essence for responding to the RFP within the submission deadlines.

The following timeline must be met for a proposal to be accepted.

Date	Action
10/10/2023	MoDOT posts RFP to the website at https://www.modot.org/research-requests-proposal .
10/31/2023 4:00 PM (Central)	Written comments or questions must be submitted to MoDOTResearchRFP@modot.mo.gov . This is the only acceptable method for contact regarding the RFP and contacting MoDOT employees via other methods is prohibited. Not adhering to this rule is cause for disqualification of the proposal. This includes all requests for information, data, and manuals.
11/15/2023	MoDOT will post written responses publicly on the website at https://www.modot.org/research-requests-proposal .
11/30/2023 10:00 AM (Central)	Written proposals must be submitted to MoDOTResearchRFP@modot.mo.gov . Do not consider your proposal submitted until you receive notification of receipt. A notification should be sent by noon of the same day.
12/22/2023	MoDOT will notify submitters about project selection, or if needed about interviews to finalize selection.

Contracting Requirements

The successful team will be required to complete additional documentation and enter into a contract such as a “Standard Research Agreement” or “Task Order.” Applicants should be aware of these additional needs so contracting can proceed in a timely manner.

As part of the eAgreements process, MoDOT uses an electronic signature tool, DocuSign, for signing agreements electronically. All parties of the agreement must agree to sign electronically in order to utilize the electronic signature option. If your proposal is selected, you will be informed about how to obtain your credentials for electronic signatures (including how to become a MoDOT vendor if you are not already).

Standard contracts, forms, attachment templates and additional information are available from the website at <https://www.modot.org/information-researchers>.

Proposal Submission

Submission Deadline

Proposals must be emailed by **10:00 AM (Central Time)** according to email time stamp by the submission date in the RFP Schedule to the Research Director's attention (Jen Harper) at: MoDOTResearchRFP@modot.mo.gov. Please reference the project title since more than one RFP may be due at one time. Electronic proposals are required.

Submission Confirmation

You will receive an email confirmation after your proposal has been received. If you do not receive such a confirmation by **12noon (Central Time)** on the day of the deadline, please contact us at MoDOTResearchRFP@modot.mo.gov as soon as possible. Your submission should not be considered received until you have received your email confirmation.