

Iowa DOT Research Request for Proposal (RFP)

It is the intent of Iowa DOT Research to enter into agreement with the responsible bidder whose submitted proposal is the most advantageous, cost and other factors considered. Other factors include but are not limited to meeting or exceeding mandatory requirements, proposed staffing, and meeting required time schedule.

- Original RFP is posted at [the Iowa DOT Research Requests for Proposal page](#).
- Questions should be submitted to the project manager, identified below.
 - Questions are due no later than 14 calendar days prior to the proposal due date. Questions and responses will be posted on [the Iowa DOT Research Requests for Proposal page](#) no later than 7 calendar days prior to the proposal due date.
- Responses must be submitted in pdf form to Proposal.Research@iowadot.us.
 - Use the following naming convention for the PDF submission:
 - **ResearchRFPNumber_Agency_PrincipalInvestigatorLastName.pdf**
- Responses must comply with the proposal guidelines in "Required Format for Iowa DOT Research Proposals." Please refer to [the Iowa DOT Research Proposal & Deliverable Guidelines page](#).

RFP #: TMRC-2027d

RFP Title: Development of Performance-Based Qualification Criteria for Blended Binder Concrete

RFP Posted: September 15, 2026

Proposals Due: On or Before November 1, 2026 at 12:00 Noon Central Standard Time.

Project Manager: Khyle Clute, khyle.clute@iowadot.us, (515)-239-1646

Budget

- ☒ Funding limitations have been established. Proposed budgets shall not exceed \$200,000.
- ☐ Proposed budgets are not limited. They will be considered during the evaluation process.

Timeline

- ☒ Timing limitations have been established. Proposed timelines shall not extend beyond 24 months.
- ☐ Proposed timelines are not limited. They will be considered during the evaluation process.

Literature Review

- ☐ A Literature Review has been performed as part of project development and should not be included as a task in the proposal. The Literature Review is available for download here:
- ☒ A Literature Review has not been performed and may be included as a task in the proposal.

Data Management Plan

- ☐ Development of a Data Management Plan (DMP) is a required task in the proposal.
Refer to [Iowa DOT DMP guidance](#) section for more information.
- ☒ Development of a Data Management Plan is not a required task in the proposal.

Problem Statement

Concrete for transportation infrastructure is increasingly produced with blended cements and with high replacement levels of supplementary cementitious materials (SCMs). Portland-limestone cement is now widely used, ASTM C595/C595M covers blended hydraulic cements made with slag, pozzolan, limestone, or combinations of these, and SCM supply has broadened to include materials from natural, industrial, agricultural, and recycled sources. These systems lower clinker content and cost, and they draw on materials that would otherwise be wasted. They also behave differently from the portland cement systems that current acceptance practice was built around.

Agencies and producers report slower and more variable early-age strength gain, changes in workability and finishability, inconsistent shrinkage, and difficulty predicting long-term durability in SCM-rich mixtures. Several established test methods have become harder to interpret for these systems. Electrical resistivity is widely used as an indicator of transport properties, but resistivity depends on pore solution chemistry, which high SCM contents alter, so measured values cannot be compared directly with historical data or with thresholds set on portland cement concrete. In cold climates, SCM-rich mixtures can complicate the achievement and verification of the air-void system needed for freeze-thaw durability and scaling resistance, and calcium oxychloride formation under deicing salt exposure adds a deterioration mechanism that composition limits do not address.

Prescriptive qualification struggles with this range of materials. Composition limits, replacement limits, and mortar strength activity tests were calibrated on a narrow set of SCMs and do not reliably rank materials whose compositions and reactivities differ widely. ASTM C1709 provides an approach for evaluating alternative SCMs that fall outside the existing material specifications, and it states that performing the tests in the guide does not imply that a material meets those specifications, that each source must be evaluated separately, and that users should apply risk management where long-term durability or field performance data are absent. ASTM C1897 measures SCM reactivity by isothermal calorimetry or bound water, and its scope notes that the correlations behind it were established for SCMs covered by the existing specifications and Guide C1709, and that their validity for other alternative SCMs has not been established. Agencies are therefore left without criteria for deciding whether a new material will perform acceptably, how much a material may vary before it must be requalified, and which measurements are worth requiring.

Objectives

The objective of this research is to develop performance-based criteria for qualifying blended binders used in transportation concrete and for deciding when a change in material requires requalification. In this project a blended binder means either a commercially manufactured blended cement used as supplied, or a cement blended with additional SCMs during concrete production. The criteria shall rest on measured relationships between material characteristics and the concrete performance that matters to agencies: constructability, early-age strength development, shrinkage, freeze-thaw and scaling resistance, and transport properties. A minimal set of material descriptors and screening tests predictive of that performance, acceptable ranges of material and mixture variability, requalification triggers, and a draft guideline in AASHTO standard format should be outcomes of the study.

The guideline shall state what a supplier and an agency should report beyond the information on a mill certificate, and shall keep the added testing to the smallest set the data support. It shall address how to interpret electrical resistivity for mixtures whose pore solution chemistry differs from portland cement concrete, and how to verify the air-void system in SCM-rich mixtures placed in cold climates. Requalification triggers shall cover changes in source, composition, processing, and supplier.

Proposals shall obtain cements, SCMs, and admixtures from at least three regions represented among the TMRC partner states, selected with the Technical Advisory Committee so that the materials reflect what those states can actually obtain. The size of the laboratory program governs whether this work finishes on time, so each proposal shall state the number of binder combinations and concrete mixtures it will test, justify that number against the schedule, and identify which tests require extended conditioning. Testing that requires more than six months of conditioning shall begin within the first year. Field demonstration is outside the scope of this project, and the Research Implementation Plan shall identify what field validation the draft guideline still requires.

Minimum Project Tasks

1. Select, with the Technical Advisory Committee, the cements, SCMs, and admixtures to be studied from at least three regions represented among the partner states, and record for each material the properties that its mill certificate or supplier documentation reports.
2. Characterize the selected materials for chemical and physical properties, reactivity following ASTM C1897, and hydration kinetics following ASTM C1702.
3. Define the test matrix of blended binder combinations and concrete mixtures, justify its size against the project schedule, and obtain Technical Advisory Committee approval before concrete testing begins.
4. Measure the fresh and early-age properties that govern constructability, including workability, bleeding rate and capacity, finishability, and time of setting, and identify where blended binders require construction procedures to change.
5. Measure strength development, drying shrinkage, air content and air-void system, freeze-thaw resistance, deicing salt scaling resistance, chloride transport, and electrical resistivity. Schedule tests requiring extended conditioning so that they finish within the project period.
6. Relate the material characteristics measured in Task 2 and the mixture variables to the measured concrete performance, quantify how much of the variation in performance comes from material source, composition, and processing, and identify the smallest set of descriptors and screening tests that predicts performance.
7. Establish acceptable ranges of material and mixture variability following qualification, and define the triggers that require requalification when source, composition, processing, or supplier changes. State the confidence associated with each range and trigger.
8. Prepare a draft guideline in AASHTO standard format covering qualification, requalification, and acceptance of blended binders, including material characterization, screening tests, performance criteria, reporting requirements, and the interpretation of resistivity and air-void measurements for these systems.

Products and Deliverables

1. Quarterly Progress Reports
2. Draft Final Report
3. Final Report
4. Technology Transfer Technical Brief
5. Research Implementation Plan(s)
6. Photo or Image Files
7. Material Characterization and Concrete Performance Database
8. Minimal Set of Material Descriptors and Screening Tests
9. Acceptable Variability Ranges and Requalification Triggers
10. Predictive Models, with Source Code and User Documentation
11. Draft Guideline in AASHTO Standard Format

Note: All products and deliverables shall comply with ADA accessibility and Section 508 requirements, regardless of funding source. Section 508 is an amendment to the federal Rehabilitation Act of 1973 mandating that all electronic and information technology developed, procured, maintained, or used by the federal government be accessible to people with disabilities. Refer to 29 U.S.C 794d for additional information.

Additional Information

- This RFP is funded through the Transportation Materials Resource Center (TMRC) under a multi-state pooled fund led by Iowa DOT as TPF-5(546). Information about the current TMRC pooled fund is available on [the Transportation Materials Resource Center pooled fund page](#).
- Proposals should show the team's experience in cement and SCM characterization, concrete durability testing, statistical analysis of material variability, and preparation of standards in AASHTO format.
- Proposals should respond to the identified budget, timeline and project goals. Additional project tasks, beyond those outlined in the solicitation, may be identified by the principal investigator if deemed useful in improving the general objective of the project. All additional tasks, budget items and timelines should be clearly identified in the proposal as extra work and shown separately from the project tasks and budget items associated with the RFP's objectives.
- ****Proposal Restrictions****
 - o Proposals are limited to 10 pages. Resumes of the principal investigator and other named team members, along with other relevant materials, may be provided for additional information in appendices, but the proposal itself shall be a stand-alone document. The proposer should not expect the reviewers to read appendices to be able to evaluate the merit of a proposal.
 - o Proposals submitted by current TMRC principal investigators that have projects one year or more behind their originally contracted end date will not be considered.
 - o Individual respondents are limited to submitting on only one TMRC proposal per year as either a principal investigator or co-principal investigator.

Non-Discrimination Statement

Iowa DOT ensures non-discrimination in all programs and activities in accordance with Title VI of the Civil Rights Act of 1964. Any person who believes that they are being denied participation in a project, being denied benefits of a program, or otherwise being discriminated against because of race, color, national origin, gender, age, or disability, low income and limited English proficiency, or needs more information or special assistance for persons with disabilities or limited English proficiency, please contact Iowa DOT Civil Rights at 515-239-7970 or by email at civil.rights@iowadot.us.