REQUEST FOR PROPOSAL (RFP) #19-03

Measuring Transport Properties of Portland Cement Concrete Using Electrical Resistivity

POSTED DATE: April 1, 2019
CLOSING DATE: April 30, 2019

Submit proposals via email to: ICTProjectManagement@illinois.edu

PROJECT INFORMATION

Funds: $400,000 total, including a required 25% ($100,000) cost share from proposing agency.
Estimated contract term: 24 months
Projected start date: Aug. 16, 2019

BACKGROUND

As Departments of Transportation (DOTs) look to adopt performance-related specifications, there is a desire to use tests that can accommodate construction’s time-sensitive nature. For DOTs, the promotion of performance-related specifications for Portland Cement Concrete’s (PCC) pavements and structures is with respect to the American Association of State Highway and Transportation Officials’ (AASHTO) PP 84.

One of the included properties is the ease with which PCC transports harmful water-borne ions (e.g. chloride ion penetration). Chloride penetration causes reinforcement corrosion and calcium oxychloride attack, leading to early joint deterioration and concrete failure. A transport characteristic, often referred to as permeability, is a controlling factor on PCC’s durability.
Currently, the transport characteristics of IDOT’s PCC mixes are controlled by specifying maximum and minimum cementitious contents, the fine-mineral replacement rate, and the water-to-cementitious ratio; however, various constituent material combinations and the validity of these characteristics for concrete placed in the field need to be determined throughout the state.

One significant hurdle in implementing AASHTO PP 84 is the need to validate AASHTO T 358 and TP 119 tests. Any proposed acceptance criterion must first be benchmarked against the state-of-the-art practice in the performance of IDOT’s mixes.

**OBJECTIVE**

The objective of this research is to provide IDOT with recommendations on the assessment of PCC transport properties, considering various PCC types — including variation in components, strength, and curing requirements, conditions, and production methods.

**RESEARCH TASKS AND REQUIRED DELIVERABLES**

The proposed research will address the following tasks:

Task 1: Literature review
The research team should conduct an extensive literature review of the current state of knowledge. Appropriate test methods should be identified for estimating PCC transport properties with the focus being existing technologies rather than development of new technology.

Task 2: Lab evaluation of selected methods
The research team should evaluate methods identified in the literature review to determine the most useful permeability testing method (e.g., identified in AASHTO’s surface testing, PP 84 T 358, or bulk testing, TP 199).

Task 3: Field test performance
The research team should perform field trials of identified methods. Field testing may cover a wide range of mix designs, production methods, and any other conditions identified as affecting test outcome or resulted in successful field implementation.

Task 4: Provide Implementation Recommendations
Based on the results of laboratory and field testing, the research team should provide recommendations on the assessment of PCC transport properties, considering various PCC types and characteristics.

Task 5: Development of training module
The research team should develop a training module to facilitate the implementation of best-practices identified in the research.
Task 6: Final Report, including findings and recommendations
Based on this research, a Final Report detailing the study process, findings, and recommendations should be prepared.

INSTRUCTIONS FOR SUBMITTING A PROPOSAL

The proposal shall be prepared in accordance with the guidelines presented in Appendix A. The contact name/email and due date should be included on the first page. All potential Principal Investigators (PIs) should read and understand the responsibilities of an Illinois Center for Transportation (ICT) PI’s role, which are presented in Appendix B.

Technical questions regarding the research project or questions regarding the RFP procedures should be submitted to ICT Project Management Team via email at ICTProjectManagement@illinois.edu. Technical questions and answers will be posted on ICT’s website as they are received.

SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ICT FUNDS

Please note that the following two conditions will be applied during the review of all proposals received and in awarding of ICT funds:

1) In reviewing and evaluating the proposals received from this solicitation, when multiple proposals are reviewed and have identical scores, preference will be given to Illinois universities (both public and private) over others.

2) The award of this project is contingent upon the availability of funds at the time of award.
APPENDIX A:
GUIDELINES FOR PREPARING PROPOSALS FOR THE ILLINOIS CENTER FOR TRANSPORTATION (ICT)

Please use the following format for submitting ICT proposals for consideration: Limit total proposal page count to 15 pages, excluding the cover page and/or appendices, and use a font size no smaller than 10. Note: We suggest Arial font with 1.5 line spacing.

1. **Cover page:**
   Use the cover page found [here](#).

2. **Research plan:**
The research plan should clearly and concisely address the proposed approach for solving the problem described in the problem statement. The research plan should be subdivided into the following sections:

   (a) **Introduction, including research objective:**
   Provide an introduction to the proposal and a concise overview of the research approach. Then outline the objectives of the research project and explain the questions that will be answered by the research.

   (b) **Research approach/work plan:**
   Include details of the research project and strategy to accomplish the project objectives. Then itemize the tasks to be completed, explaining in sufficient detail what will be done, produced, or completed with each task.

   (c) **Anticipated research results:**
   State the anticipated research results and deliverables.

   (d) **Expected implementable outcome:**
   Describe how the anticipated research results can be used to support IDOT’s implementation of the expected outcome(s).

3. **Qualifications and accomplishments of the research team:**
Identify who will perform the research and provide a brief explanation of each researcher’s qualifications to perform the research. Provide examples of similar research the proposed individuals have performed.

4. **Other commitments of the research team:**
Briefly outline the other commitments of the proposed principal and co-principal investigators to demonstrate both will be able to fulfill the proposal commitments.

5. **Facilities and equipment:**
Describe the facilities and equipment available to undertake the research proposal. Under the terms of the Inter-Governmental Agreement between ICT and IDOT, laboratories meeting the criteria of Bureau of Materials policy memorandum 6-08 require proof of qualifying laboratory status. More information on this will be provided if and when a proposal is selected for funding.
6. **Timeline requirements:**
A timeline of the research project’s tasks must be included in this section. Describe the amount of time required to complete the research proposal, including final report preparation, ICT’s editing, TRP review of the report, and final review/publishing of the report. Please plan on submitting the draft final report to ICT for initial editing at least three months before the project’s end date. Listed below is an example project timeline.

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<thead>
<tr>
<th>Project Milestones</th>
<th>2019</th>
<th>2020</th>
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<tbody>
<tr>
<td>Kickoff Meeting</td>
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<tr>
<td>PI conducts Research</td>
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<td>PI writes DRAFT report</td>
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<tr>
<td>PI Submits Final DRAFT report to ICT for editing</td>
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<td>ICT Preliminary editing phase</td>
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<td>PI/TRP editing phase</td>
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<td>Final editing phase</td>
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<tr>
<td>Report Posted to ICT website</td>
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<tr>
<td>(Quarterly Progress Reports Due)</td>
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<td>(Semi-annual Evaluations Due)</td>
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<td>(TRP / PI Meetings)</td>
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7. **Itemized budget:**
Provide an itemized budget for the entire project, including the cost of personnel, consultants, subcontracts, equipment, materials, travel, overhead/indirect costs, and cost share (match).

Each project must include a budget that clearly shows the portion of the total cost requested from IDOT/ICT (75%) and the matching funds/cost share (25%) required from the proposing agency. The indirect cost rate, also known as overhead or facilities and administration (F&A), used for F&A cannot exceed 50% of the modified total direct costs. If a subaward is necessary for extra support outside the proposing agency, note that the sub-award cannot exceed 50% of the total project budget without prior approval.

A part of the 25% cost-share requirement may be fulfilled through the use of unrecovered indirect costs. Any proposal submitted by an organization outside of the University of Illinois system that plans to use unrecovered indirect cost to meet part of the required 25% cost share must submit a request for approval to IDOT/ Federal Highway Administration (FHWA). More information on this letter will be provided if and when a proposal is selected for funding.

Please refer to ICT’s budget templates when submitting a proposal to ICT: [UIUC Budget Template](#); [Subawardee Budget Template](#).

8. **Budget justification (narrative):**
Each project must include a budget justification that explains the itemized budget in narrative form. The budget justification provides sufficient detail so there is clear understanding of how the project costs were calculated and why they are necessary. The narrative discussion of the project cost categories and related line items should be presented in the same order as they appear in the itemized budget.

If this project will require out-of-state travel or to in-state conferences, please list and explain the travel here. PIs requesting out-of-state travel or in-state conferences using
ICT/IDOT funds must complete a Travel Request Form for PIs and Research Assistants before traveling.

If this project requires the purchase of equipment, list equipment purchases here. Equipment purchases above the $500 threshold must have an Equipment Purchase Request Form submitted and approved prior to purchasing.

9. **Cooperative features (if appropriate):**
   If assistance or cooperation is required from other agencies, public or private, to complete the proposed research, describe the plans for securing assistance.

10. **Appendices (if appropriate):**
    Items, such as statements regarding previous work on the problem or related problems, abstracts of related projects, a bibliography or list of references, or materials describing the submitting organization, may be included here.
APPENDIX B:
Principal Investigator (PI) Quick Reference Guide for ICT / IDOT Sponsored Projects

Downloadable forms and guidelines are available at:
ict.illinois.edu/research/formsguidelines

1. Prepare and submit a detailed work plan:
The project’s work plan is to include a line-item budget, budget justification, implementation strategy, and deliverables. It should be consistent with the ICT Request for Research Ideas submission or RFP (whichever is applicable).

Please note that the federal funding used by IDOT and ICT for this contract research program requires IDOT have access to and share technologies and information developed through this contract research program.

Any software, databases, or related computer programs developed under this study and identified as a research project deliverable in the initial research project work plan, will become property of IDOT and ICT. IDOT and ICT will provide free use of the software to both IDOT and the federal government, and may share it with other states and governmental entities.

2. Finalize work plan with TRP:
Revise the work plan as agreed upon with the TRP. Email the approved work plan and budget to ICT (ictprojectmanagement@illinois.edu), which will assign a project number and enter project data into the ICT website database.

3. Complete PI section in the online ICT project database:
Log into the database by visiting the ICT website (apps.ict.illinois.edu/projects). New PIs can request a user name and password from ICT by emailing ictprojectmanagement@illinois.edu. Click on View/Edit My ICT Projects then click on the Edit icon on the right side of the screen and complete the following sections:

(a) Personnel:
Add project team members, including co-investigators and students.

(b) Project details:
Add project tasks, a project description, the progress and significant results this quarter, the anticipated work next quarter, update the project schedule status and provide any project impediments, and recommended solutions.

4. Upload files or photos:
Click on the Files icon in the upper right corner of screen and complete the following fields: Document type (required), document title, authors, and abstract. Then use the Browse for File button to navigate to the directory on your
computer and select the file you wish to upload. This process should be repeated for any additional files or photos. You may also use the **email us** link at the bottom of the screen to send ICT the files to upload.

5. **Conduct research as agreed upon with the TRP:**
   Notify the TRP if any problem develops during the project.

6. **Provide quarterly progress reports (QPRs):**
   No later than the end of each calendar quarter, update your project’s online QPR and send to the TRP chair for review and approval. ICT will send emails reminding PIs to complete the QPR for their research projects.

7. **Provide research progress updates to TRP:**
   Participate in all TRP meetings as scheduled by the PI and TRP chair, generally once per quarter — at least every six months, to provide project updates and answer TRP members’ questions about the project. Kick-off and final meetings should be held in person. All other TRP meetings may be held in person, remotely, or a combination thereof. If you would like help setting up a remote meeting, ICT can help facilitate this. Provide any presentations in advance to the meeting recorder at ictprojectmanagement@illinois.edu. Complete implementation worksheet with the TRP’s help and then review/update as necessary at TRP meetings.

8. **Complete a semi-annual Administrative Performance Evaluation of the TRP:**
   You will be sent a reminder 30 days prior to the evaluation deadline to download and complete the form.

9. **Write project report:** A final research project report in accordance with ICT guidelines is required to complete your project. Reports should fulfill project objectives set forth in the work plan, show adequate documentation, and be presented clearly and concisely. The **maximum page length is 75 pages**, approximately 35,000 words, excluding appendices. Specific **report writing guidelines** may be downloaded from the ICT website. Complying with these guidelines will minimize publication delays. You will receive reminders from ICT to draft your project report six months and four months prior to the project end date.

10. **Submit project report to ICT for editing three months prior to project end date:**
    Three months before the project’s end date, submit the draft report to ICT for editing (**prior to submission to the TRP**). The three-month editorial process is conducted in three phases as follows:

    (a) **Preliminary edit phase:**
    The PI submits the complete report to ICT Program Management (**ICTProjectManagement@illinois.edu**) in MSWord format. The template can be downloaded [here](#). The PI should follow the ICT report formatting guidelines. **Reports that do not follow ICT guidelines will be returned to**
the PI for resubmission. A comprehensive technical edit of the report will be performed and then returned to the PI for review and revision. Additional useful documents and forms are on the Report Guidelines and Documents page.

(b) PI/TRP edit phase:
The PI reviews the ICT technical edits, accepts/rejects changes, addresses all comments, and forwards the edited report to the project’s TRP Chair for review.

(c) Final edit phase:
When the report is approved by the TRP Chair, the PI forwards the final report and the Final Edit Phase/TRP Final Approval form to ICT Project Management for final editorial review. Reports submitted without the TRP approval form will not be accepted.

NOTE: The three-month report editing and review process must be built into your project timeline. That is, if your project ends on Dec. 31, your report should be sent to ICT Project Management for editing no later than Sept. 30.

11. To participate in the publication or public disclosure of project information prior to the final report being published, IDOT approval must be obtained. IDOT requires 21 days to review the approval request. After 21 days, publication or public disclosure of non-confidential and non-patentable results in professional refereed or peer-reviewed journals or papers to be presented at professional meetings may proceed without interference. The publication or release of non-scholarly work products, any information that is deemed confidential by IDOT, or information which includes patentable results may not be published/released without IDOT’s approval. If the scheduled time for presenting project information previously reviewed by IDOT does not permit formal review of a complete publication or presentation, refer to the contract and contact ICT for further instruction.

12. Comply with the terms of the current ICT intergovernmental agreement, approved by IDOT July 2017:
This agreement can be found on ICT’s website on the ICT Forms and Guidelines page.

13. Comply with the current ICT operational guidelines:
Current guidelines can be found on ICT’s website on the ICT Forms and Guidelines page.