



New Jersey Department of Transportation
Bureau of Research
RESEARCH PROJECT
Request for Proposal
2022 – 2023 SPR Program

Project Title: Extend Service Life of Concrete Bridge Decks with Internal Curing
Posting No.: 2022-09
Date of RFP Announcement: 08/29/2022
Closing Date: 10/17/2022

Proposals must be prepared in accordance with NJDOT's *Supplemental and Proposals guidelines*. Please visit <https://www.state.nj.us/transportation/business/research/guidelines.shtm> for the most current version.

All proposals must also have a corresponding online PreAward Risk Assessment form completed and submitted by the PIs prior to the RFP closing date and time. This online form can be found at: https://www.state.nj.us/transportation/business/research/risk_assessment_forms.shtm

1 - RESEARCH PROBLEM STATEMENT AND OBJECTIVES

"Curing is a critical step in concrete pavement construction. Due to the large surface area to be covered, external curing methods normally do not provide concrete with necessary moisture conditions for long-term hydration. Insufficient curing often causes internal cracks or shrinkage cracks on the surface of the pavement. These early-age cracks not only hurt the strength, but also increase the permeability so that chlorides and other aggressive ions can easily penetrate deep into concrete to cause corrosion of rebars. This will shorten the life-span of concrete pavements, especially concrete bridge decks, as de-icing chemicals are often used.

Internal curing, on the other hand, provides a modern twist on good curing practice by providing water to the cement matrix after setting. Internal curing can be achieved by using carriers such as pre-wetted lightweight aggregates, super absorbent polymers, or chemical admixtures. Each carrier may have different impact on the current practice of concrete bridge deck construction. Knowledge on optimized dosage, raw material preparation, concrete mix proportion, and field placement procedures are needed. Very recently, Nebraska DOT and North Carolina DOT both had funded 3-year research projects on internal curing. Considering the pavement condition in New Jersey, having such a research project will benefit the state to improve the quality and durability of the bridge decks, thus save efforts and costs on both maintenance and repairing.

"Internal curing can minimize concrete cracking at very early age. Early age cracking, most are due to shrinkage caused by lacking curing, will hurt the long-term performance and the durability of concrete. It may cause severe corrosion of rebars, as chlorides and other aggressive ions from deicing chemicals can easily penetrate deep into the concrete layer. Internal curing can also lead to a denser structure of concrete, so that the material is better performed when freeze-thaw cycles happen.



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Considering the geographic location of New Jersey and the dense population, the pavement maintenance cost is huge each year. Therefore, improve the quality of pavement can not only save efforts and costs of repairing, but also making it a safer place to commute for NJ residents

1.2 Research Objectives

The overall goal of this study is to identify a cost-effective practice of internal curing of bridge deck concrete for NJDOT, considering the geographic location of NJ, dense population, the pavement, and maintenance cost. To achieve the goal, the specific objectives of this study are to.

Phase 1: Summarize the best practice of internal curing concrete for bridge deck application through an extensive literature review and survey.

Phase 2: Based on the research in Phase 1, literature, and survey, develop phase II work plan with specific tasks for review and approval.

- Determine the appropriate source and addition rate of Light Weight Fine Aggregates (LWFA) for internal curing of New Jersey concrete bridge decks.
- Evaluate the technical feasibility and benefits of internal curing for New Jersey bridge deck construction.

The research team shall submit progress reports, make presentations at progress meetings as per RPM request and make possible adjustment of work plan if necessary.

A final report shall include the research details, findings, summary/conclusions, recommendations from both phases. The research team shall recommend with NJDOT staffs/SMEs input,, ex-prospective New Jersey request for possible implementation phase to be separately posted as an implementation RFP.

1.3 Type of Contract

It is proposed that if the Issuing Office enters a contract because of this Request for Proposal (RFP), it will be a **Cost Reimbursement, Deliverable-Based** contract containing the Standard Contract Terms and Conditions.

2 - BUDGET and CONTRACT TIME

The **TOTAL** project budget shall not exceed **\$400,000 US Dollars**. Budgets will be evaluated separately, and only after a selection has been made as to which proposal is the most qualified based on technical merit.

The PI must provide the anticipated research study duration based on the proposed tasks. Consideration should be given to potential impediments so that adjustments are incorporated into the schedule minimizing the need for time extensions. Contract time shall include sufficient time for the procurement of subcontractors, as well as no less than three months for Final Report review



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and acceptance. Please be advised that going forward, new task orders having permissible justification will be allowed no more than a one-time extension with the advent of 2 CFR 200.

An 24-month total project duration is preferred.

Please provide a Gantt Chart schedule, by month number (e.g. 1-24), showing tasks start/end, and deliverables. List corresponding deliverables below the chart.

3 - Oral Presentations

Oral online presentations may be requested as part of this RFP. If required, you will be notified by the Bureau of Research to schedule your oral presentation. They will be held at NJDOT headquarters in Trenton, NJ, attended by the Technical Advisory Panel (TAP), and be limited to no more than an hour, including time for questions and answers.

4 – Deadline

Proposals (no hard copies required) are due at the NJDOT Bureau of Research no later than **4:00 p.m. on October 17, 2022**. Electronic proposal documents (preferred pdf) shall be emailed to Research.Bureau@dot.nj.gov with the subject: RFP-2022-09 University – PI's name.

Approximate Start Date: 01/09/2022. The official start date is the date that the Bureau of Research obtains a signature from the Assistant Commissioner.

5 – CONTACTS

Interested parties shall send all questions related to this RFP to the Research Bureau Manager by sending an e-mail to Amanda.Gendek@dot.nj.gov or by phone (609-963-2242). Questions on this topic **shall not** be directed to any Research Project Manager, Research Customer, or any other NJDOT person. All questions must be received **on or before 09/16/2022 in order to be answered.**

PROPOSAL DELIVERY INSTRUCTIONS:

Electronic proposal documents (preferred pdf) shall be emailed to Research.Bureau@dot.nj.gov

with the subject: *RFP-2022-09 University – PI's name*

A confirmation of receipt will be sent via email.