Airport Concrete Pavement Technology Program (ACPTP)

Request for Proposal (RFP) ACPTP 2026-16

Silicon-Based Surface Treatments for Airfield Concrete Pavements

BACKGROUND

Airfield concrete pavements are exposed to heavy aircraft loading and harsh environmental conditions that accelerate surface deterioration, creating safety risks and increasing maintenance costs. Spray-applied silicon-based surface treatments for hardened concrete are being suggested to improve durability and extend pavement life, but the range of products on the market show variable performance depending on material type, application timing, and field conditions. These surface treatments include silica nano-products, and silicate densifiers that are being marketed to improve pavement surface properties. Performance claims include surface hardening, sealing, penetration into pore structure, crack healing and contaminant removal.

Currently, no standardized framework or industry specification to evaluate, compare, or qualify these products for use on commercial or military airfields exists. This lack of guidance limits an airfield owner's ability to confidently select effective treatments, quantify their benefits, or incorporate them into maintenance and rehabilitation strategies.

There is a need to systematically evaluate silicon-based spray-applied surface treatments for in-service concrete and to develop a performance-based framework for testing, comparing, and qualifying products. Such a framework would support consistent specifications, reduce risk, and enable broader, more effective adoption of these technologies in airfield pavement management.

OBJECTIVES

The intention of this project is to conduct research defining and investigating silicon-based surface treatments for hardened concrete, which may have positive impacts on an airfield pavement surface. At a minimum the research should address the following:

- Understand the types of silicon-based spray-applied surface penetrating treatments and how each type interacts with hardened concrete pavement
- Review previously reported research on these materials
- Document where and how these types of products have been used on an airfield and what benefits they have provided regarding hardening, sealing, and crack healing, and what challenges have been encountered with their use
- Address questions regarding their efficacy as surface enhancing materials

- Develop performance-based laboratory and field evaluation procedures that may be used to qualify products for use on airfield pavement.

- Develop tech transfer materials to assist practitioners in surface treatment selection and use.

TASKS

The Principal Investigator (PI) will be responsible for executing a series of tasks within the time and budget available such that, when finished, it will result in the completion of the objectives of this study. The proposal does not necessarily need to reflect the exact budget, or the performance period indicated in the RFP; however, any deviation must be justified and clearly explained.

SCOPE OF WORK

Proposers should recommend tasks to accomplish the objectives of the research in this RFP. At a minimum, the following work is suggested:

Task 1- Literature review
A literature review should include the following at a minimum:

- The general forms that silicon-based surface treatments take
- Previously reported research
- Available products and where they have been used on airfields to the extent possible
- How they work
- What benefits they provide
- What they do not do
- Determine the gaps in the knowledge base about these materials

After the literature review the PI should develop and present a work plan to meet the objective of the research. Following the work plan's approval by the PTP, conduct the work planned which should include the following tasks.

Task 2 – Laboratory work to:

- Assess how a range of products affect surface properties of concrete
- Develop a test protocol including appropriate pass / fail limits
- Evaluate benefits compared to traditional approaches

Develop a framework to qualify products for use on airfield pavement using performance-based laboratory and field evaluations.

Task 3 – Develop a guide:
Develop a guide on selection and application of products for airfield pavement construction and maintenance applications. Additionally, the PI should develop tech transfer materials to assist practitioners in their selection and use.

Task 4 – Draft Final Report:
The Project Technical Panel expects that the product of this work will be a practical guidance document recommending the minimum requirements to develop specifications that can be prepared by the FAA, Department of Defense, and/or other airfield agencies to allow the use of relevant products in an airfield application. The report should include details of the work conducted, results collected, and conclusions drawn.

DELIVERABLES

PTP Meetings: The selected team will meet virtually with the PTP every six months to review progress and direction of the project.

Quarterly Report: Quarterly reports will be due the 15th of the month following the quarter (April 15, July 15, October 15, January 15). The quarterly report should identify current or anticipated problems as well as work accomplished during the quarter and present the next quarter's planned activities.

Draft Final Report: A draft final report is due 4 months prior to the end of the contract.

Final Report Review: Following the Project Technical Panel's (PTP) review of the final report, the researchers and PTP will meet (virtually) to discuss the work conducted and the outcomes of the project.

Final Report: The PI will have 2 months to submit a final 508 compliant report.

FUNDS AVAILABLE: Not to exceed $500,000

CONTRACT TIME: Not to exceed 36 months (final report due 32 months from project start)

ACPTP 2026-16 PROJECT MANAGER: Dr. Peter Taylor, ptaylor@iastate.edu

QUESTIONS ON RFP: E-mail to ACPTP@iastate.edu prior to October 1, 2026 Answers will be posted at https://cptechcenter.org/airport-pavements/acptp/

PROPOSAL PREPARATION INSTRUCTIONS: https://cptechcenter.org/airport-pavements/acptp/

ESTIMATED NOTICE TO PROCEED DATE: January 1, 2027

PROPOSAL DUE DATE: **Tuesday, October 6, 2026** not later than 4:00 P.M. (Central Time)

PROPOSAL SUBMIT: ACPTP@iastate.edu (PDF proposal plus Excel spreadsheet; see proposal instructions)