

**ARKANSAS DEPARTMENT OF TRANSPORTATION
SYSTEM INFORMATION AND RESEARCH DIVISION
FISCAL YEAR 2021
REQUEST FOR PROPOSAL
RESEARCH PROJECT NO. TRC2103**

TITLE: Developing Guidelines for Evaluating Weathering Steel Bridges

ARDOT POLICY

All proposals shall be submitted electronically per the Proposal section of this Request for Proposal. As of Fiscal Year 2020, all research project contracts will be managed under Info Tech's Doc Express Paperless Contracting platform. All information on the utilization of this platform for research projects can be found at http://www.ardot.gov/System_Info_and_Research/research.aspx or from the Research Section.

PROBLEM STATEMENT

Weathering steel is used to protect a structural member for corrosion. Highway departments often use weathering steel for bridges with the expectation that the weathering steel structure will not corrode. Weathering steel has improved corrosion-resistant behavior over conventional steel; however, weathering steel is not maintenance-free and will corrode if not used in proper ambient conditions. Weathering steel retards corrosion, but may require future restoration thorough cleaning and painting. ARDOT inspects 1192 weathering steel bridges. Of these, 908 structures are state owned and have an element level inspection. Approximately 23% of these structures are documented to have oxide film degradation of the steel protective coating, patina (AASHTO bridge inspection code 3430). Other states have also experienced this condition resulting in highway departments facing the dilemma of how to restore weathering steel sections that have experienced corrosion due to chlorides and other contaminants. Consequently, guidelines need to be developed for bridge inspectors to evaluate the patina at weathering steel bridges and how to restore steel sections that are experiencing corrosion.

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AREA OF STUDY

The objective of this project is to identify, develop, and implement a framework for evaluating weathering steel bridges in Arkansas. This will be accomplished by:

1. A review of ARDOT bridge inspection reports, for bridges constructed using weathering steel that are identified as having oxide film degradation or other section loss issues.
2. Identify weathering steel bridges for their future potential for oxide film degradation considering location, bridge types (overpass, hydraulic structure, proximity to water, characteristics of the body of water, etc.).
3. Prioritize weathering steel bridges for remediation.
4. Survey other state DOTs for the performance of their weathering steel bridges and their remediation procedures.
5. Recommend ARDOT protocol for proper use of weathering steel for future bridge designs (bridge site conditions, ambient conditions).
6. Recommend changes to ARDOT Bridge Division Guidelines to minimize conditions that may lead to patina deterioration and section loss.

METHOD OF STUDY

The project will include but is not limited to the following tasks:

1. This project will consist of a comprehensive review of ARDOT bridge inspection reports as they pertain to oxide film degradation or other section loss issues on existing weathering steel bridges.
2. Review current ARDOT and AASHTO guidelines.
3. Perform a comprehensive performance assessment of weathering steel in bridges based on a review of the literature on what other states DOTs are doing. Evaluate whether or not the current guidelines are being used correctly and consistently statewide.

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4. ARDOT will provide a list of specific parameters/criteria: corrosion quantities, steel quantities, protective coating condition states, section loss, etc., to determine which bridges to focus on during this study.
5. The Principal Investigator (PI) shall coordinate and schedule with the Project Manager before any site visit inspection with the use of ARDOT employees for equipment, traffic control, etc.
6. The PI will provide monitoring, testing, and data collection for all selected project sites.

BENEFITS

A detailed cost-benefit analysis shall be included in the proposal. The analysis must include but is not limited to the following:

1. Detailed cost analysis on savings to the Department with full implementation of the projects findings.
2. Any anticipated benefit not foreseen as a cost savings.

TIME AND FUNDING OF STUDY

Work will begin no earlier than July 1, 2020, contingent upon acceptance of the proposal and availability of research funds. The length of the project shall be 24 months. A final report is to be drafted and presented to the Research Subcommittee no later than the last day of the project. Up to 25% of the estimated project costs will be withheld pending final acceptance of the final report. Failure to deliver the required Final Report at the end of the project will result in the cancellation of the project and 25% of the total project cost will be retained by the Department.

REPORTS

All reports must be in accordance with the 2019 Research Manual (available at http://www.ardot.gov/System_Info_and_Research/research.aspx or from the Research

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Section). All reports are required to be submitted through the appropriate Doc Express process. An Implementation Report which details the recommended means/techniques for using the project results shall be submitted to the Department six (6) months prior to the research project's Final Report. All Final Reports are required to be reviewed by a technical editor before submission to the Department. An oral report to the Transportation Research Committee may be required. In addition to reports and publications, the Department shall be furnished one (1) copy of any master's thesis or doctoral dissertation which is a result of any investigation or study on this project. The submitting of any report to be published by an outside publication or presentation on this project before its completion; shall be submitted for the Department's approval before submission.

PROJECT DELIVERABLES

The proposed research will provide ARDOT with a final report and implementation plan, which will discuss how to incorporate inspection guidelines on evaluating patina corrosion conditions of weathering steel bridges. Project deliverables shall consist of but are not limited to:

1. Workforce training by recommending an ARDOT protocol for using weathering steel for future bridge designs (bridge site conditions, ambient conditions, etc.).
2. Recommendation on developing a Technology Transfer (T²) Program course to inform and educate cities and counties on guidelines on how to evaluate patina corrosion conditions on weathering steel bridges within Arkansas.

AUTHORIZATION TO BEGIN WORK

A letter separate from the contracting documents authorizing the beginning of work will be transmitted through Doc Express initiating the project. Any cost incurred before the authorization letter is received, will not be eligible for reimbursement. The project will begin work no earlier than July 1, 2020.

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EQUIPMENT

A complete physical verification of all software and equipment purchased or built for use on this project and the actual location of the equipment will be made each year. An Equipment Capitalization Notice is available from the Research Section for the reporting of software or equipment purchased during the project. All software developed on the project will be completed in open source format and ARDOT shall be provided a copy of the source code. If non-expendable or special equipment is purchased with project funds, the equipment is owned by ARDOT and disposition of the equipment will be determined by ARDOT at the project's closeout session.

All rental rates shall be approved by ARDOT before the approval of the proposals. Should a subcontract be part of the proposal, ARDOT will not approve the purchase of any equipment in the subcontract. Any equipment purchased through ARDOT's Transportation-Related Research Grant Program is not eligible for rental rate charges.

All equipment shall be purchased in accordance with the State of Arkansas purchasing laws.

PROPOSALS

Proposals shall be submitted in two separate electronic formats, a word document and a pdf, to Research@ardot.gov no later than the end of business on April 3, 2020. This is a firm deadline. All procedures shall be in accordance with the 2019 Research Manual and Federal Aid Policy Guide (FAPG). In the event of policy contradiction, the FAPG shall govern.

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Upon approval of the electronic version of the Proposal by the Research Subcommittee the Project Manager will initiate the process within Doc Express to acquire the appropriate electronic signatures from all parties.