



Request for Proposal: Reference Manual for the Design, Detailing, and Maintenance of Uncoated Weathering Steel in Bridges

August 2020

The American Institute of Steel Construction and National Steel Bridge Alliance are seeking proposals, due to AISC/NSBA by September 30, 2020 for the development of a Reference Manual for owners and engineers for the design, detailing, and maintenance of uncoated weathering steel (UWS) in bridge applications.

Background

Since the early 1960's, uncoated weathering steel (UWS) has been shown to be a cost-effective corrosion protection solution for steel bridges in the United States, and internationally. UWS eliminates the need for painting or galvanizing (i.e. liquid coatings), and results in decreased fabrication time with zero volatile organic compounds (VOC) emissions. Additionally, for bridge owners, UWS eliminates the costs associated with in-service maintenance associated with liquid coatings, thus making bridge maintenance easier and more cost effective to over the service life. However, when not properly understood, specified, detailed or maintained, these benefits can be diminished. In the 1980's and in response to performance concerns from a few states, the Federal Highway Administration (FHWA) hosted a two-day workshop resulting in FHWA Technical Advisory (TA) 5140.22 published in October 1989. This TA provided some broad guidelines for the application of UWS. In the 31 years since its initial release, the TA has not been updated.

Beginning around 2011 the FHWA Turner Fairbanks Highway Research Center has been overseeing research conducted via the Long-Term Bridge Performance Program (LTBPP) to collect and analyze data on the long-term performance of UWS bridges in the U.S. These efforts have intended to improve understanding of the differences in UWS corrosion performance, including consideration between different states and climates. The research has progressed under three phases. Phases 1 and 2 are completed and have been reported and published (McConnell et al. references listed below). Phase 3 is currently underway and nearing completion with estimated publication date of mid-year 2022. Data and conclusions made available through these research efforts should be used to update current practices and guidelines, including the FHWA Technical Advisory 5140.22.

Objective

The objective is to compile all available research, guidelines, technical advisories, or other pertinent resources into a synthesized *Reference Manual*. The Manual is intended for educational and marketing purposes that NSBA can use to promote the use of, and assist engineers in the design and maintenance of, UWS bridges. The anticipated users of the deliverable will include bridge owners, design consultants, state asset managers, bridge maintenance managers, and bridge inspectors. More detail for each deliverable is provided below.

Reference Manual

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The Manual is intended to be a publication-ready Reference Manual on the use of UWS for bridges. The Manual is to be a comprehensive reference that compiles, organizes, and summarizes accepted literature on UWS in bridges. Topics covered will include the history, metallurgy, performance, economics and current best practices (e.g., detailing, substructure staining control, patina development, location and environmental guidance, “roofing”, drainage, washing, maintenance, inspection, etc.) of UWS in bridges. The following are the anticipated topics covered in the Manual, at a minimum: background, design and detailing, fabrication and construction, in-service inspection, and maintenance. The Manual must also include a discussion emphasizing the benefits of UWS as it relates to:

- Shortened project duration speed including material availability benefits
- accelerated fabrication due to no paint system required
- accelerated construction due to no field painting or paint repairs being required

The Manual shall be submitted in the original digital Word file using single column format. All image files shall also be included as separate files (e.g. JPEG, PNG, etc) with attribution noted, as appropriate.

Requirements

The Contractor shall provide all personnel, equipment, supplies, supervision, or other resources required to complete the objective of the research. The objective has been broken out into several general tasks, listed below. The Contractor will be required to coordinate schedule, tasks, progress updates, and draft materials through the appointed AISC/NSBA project manager. All materials written or developed under the research shall be submitted to AISC/NSBA for review and comment prior to final submission. Submitted reports shall comply with the AISC *Guidelines for Authors and Copy Editors for the Preparation and Submittal of Manuscripts for AISC Design Guides, Engineering Journal Articles, and AISC Standards* found [here](#). AutoCAD generated figures or sketches shall comply with the AISC *AutoCAD Figure Style Guide* found [here](#).

The general tasks of the research for the development of the project objective include the following, at a minimum:

1. **Task 1 – Project Kick-off:** The Contractor will coordinate and conduct a kickoff meeting with designated AISC/NSBA research oversight committee members. The kickoff meeting will be a web-based meeting led by the Contractor explaining the research requirements, plan for execution, and estimated schedule for completion. This meeting will provide the opportunity for the AISC/NSBA research oversight committee members to ask questions as well as providing insight and recommendations.
2. **Task 2 – Literature Review:** The contractor will perform a literature review that will compile industry knowledge on past, present and potential future use of UWS in bridges. This should include both domestic and international sources, (e.g., 2020 [New Zealand Weathering Steel Guide for Bridges](#) or [Weathering Steel Design Guide for Bridges in Australia](#)). At a minimum, the following shall be included:
 - Federal Highway Administration Technical Advisory 5140.22
 - Steel Bridge Design Handbook: Corrosion Protection of Steel Bridges. FHWA-HIF-16-002, Vol 19 by R. Kogler.
 - *Performance of Weathering Steel in Bridges*. NCHRP Report 272 by P. Albrecht and A. Naeemi.
 - *Guidelines for the Use of Weathering Steel in Bridges*. NCHRP Report 314 by P Albrecht, S. Coburn, F Watter, G. Tinklenberg, and W. Gallagher.
 - *National Review on Use and Performance of Uncoated Weathering Steel Highway Bridges*. ASCE Journal of Bridge Engineering DOI: 10.1061/(ASCE)BE.1943-5592.0000580 by J. McConnell, H. Shenton, D. Mertz, and D. Kaur.

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- *Performance of Uncoated Weathering Steel Bridge Inventories: Methodology and Gulf Coast Region Evaluation.* ASCE Journal of Bridge Engineering DOI: 10.1061/(ASCE)BE.1943-5592.0000948 by J. McConnell, H. Shenton, and D. Mertz.
 - *Standard Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels.* ASTM G101.
 - *Performance of Weathering Steel in Highway Bridges, A First Phase Report,* published by AISI in 1982.
 - *Remedial Painting of Weathering Steel: State-of-the-Art Survey, A Second Phase Report,* published by AISI in 1984.
 - *Performance of Weathering Steel in Highway Bridges, A Third Phase Report,* published by AISI in 1995.
3. **Task 3 - UWS Reference Manual:** The Contractor will compile the results of the literature review performed in Task 2 into the synthesized Reference Manual. The Contractor will cite all applicable resources used for the Reference Manual, as appropriate.
 - 3.1. **Task 3a – Interview of Owners:** The Contractor will contact a minimum of 5 owners (DOTs) of UWS bridges (identified by AISC fabricators) to discuss the performance of UWS bridges. The Contractor will document what details are used to improve performance and what details should be avoided.
 - 3.2. **Task 3b – Draft Outline:** The Contractor will generate an outline for the Reference Manual showing all sections and subsections of the Manual. This outline will be submitted to the research oversight committee for review, comment and final approval.
 - 3.3. **Task 3c - Finalization:** Based on the approved outline, the Contractor will write the content of the Reference Manual, including all discussion, tables, and figures, etc.
 4. **Task 4 – Draft Deliverable:** Submit publication-ready draft Reference Manual for review and comment.
 5. **Task 5 – Final Deliverable:** Submit the final version of the Reference Manual.

Proposals are to include all of the information and sections in Appendix A of this RFP. A sample agreement and guidelines for writing reports can be found at www.aisc.org/research. The submission of a proposal indicates your agreement with the terms and guidelines found therein.

Schedule

Submit a schedule for the tasks allowing 2 weeks for Task 3b, as well as 4 weeks for Task 4 by AISC/NSBA and other oversight committee members, as applicable. Projects up to fourteen months will be considered.

Periodic Progress Meetings

The Contractor shall agree to coordinate, attend, and lead discussions for monthly progress meetings. These are expected to be web-based meetings to allow for remotely located staff and oversight committee members to attend. For any physical meetings, AISC will pay customary travel expenses agreed to by AISC or required for physical meetings.

Proposals must be emailed to huber@aisc.org by 5PM CST on September 30, 2020.

We appreciate your interest and consideration and look forward to receiving your proposal.



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Appendix A: Proposal Instructions

A. Submittal Process

Investigators shall submit their proposals via email to huber@aisc.org by **September 30, 2020**.

Each investigator assumes full responsibility for delivery and deposit of their completed proposals by the proposal submission date. AISC's standard terms and conditions will apply to this project. These terms include AISC's rights to review reports before they are disseminated or published and to use and distribute reports resulting from the work. The terms and conditions are available in the form of a model agreement on the AISC research webpage at www.aisc.org/research.

Investigators may withdraw their proposals at any time prior to award of the contract. Investigators who decide to withdraw their proposals must notify AISC of such withdrawal in writing.

Any costs associated with presenting or preparing any response to this RFP are the responsibility of the Investigator. AISC will not reimburse any Investigator for costs associated with the preparation and submittal of this response.

B. Selection Criteria

AISC and the Committee on Research will select the winning proposal and make the announcement by November 9, 2020. The criteria that will be used in the evaluation will include:

- Qualifications of PI
- Suitability of the proposed work to accomplish deliverables
- Adequacy of resources
- Potential for success

C. Proposal Guidelines and Requirements

Proposals must include all of the following information.

1. Investigators

Please list names, complete contact information (postal address, e-mail, phone), and provide C.V.s of the principal investigator and co-investigators.

2. Test Facilities and Equipment

Include a short description, including pertinent capabilities, of any equipment or facility. Describe only those resources that are directly applicable for this project.

3. Description of the work

List the major tasks included in the project including descriptions of the analyses and tests anticipated. Include a test matrix and quantities.

4. Schedule and Milestones

Using the following format, please prepare a detailed timeline which will be used to track project progress. Your timeline should include the following information as well as both intermediate and final milestones:

- Preparatory as well as major testing phases
- Material properties and quantities to be ordered. If none please indicate.
- Fabrication, if any.
- Test dates, locations and quantities, if any.
- Report submittals, final and progress. (At least one progress report every 6 months)

Example:

Milestone	Completion Date
Project Start	x/x/x
Startup Tasks	
Kick-off meeting with AISC/NSBA oversight committee	x/x/x
Order material, test frame preparation, etc.	x/x/x
Testing	x/x/x
Analysis/Post-processing	x/x/x
Interim Report Due	x/x/x
Additional testing/analysis	x/x/x
Final Report Due	x/x/x

5. Codes, Standards and Test Protocols

When applicable, designs, including test specimen design and proposed design procedures, shall comply with the AISC specification or other appropriate current design specification except as they relate to the concept being evaluated. Variances from current standards shall be documented.

6. Budget

Please complete and return a breakdown of the project budget for the entire project, including key personnel, facility, lab, or equipment costs, overhead, and other necessary line items. Include an individual budget sheet for each calendar year in which this project will be performed. For example, if the project is awarded in 4th quarter 2020 and work will carry into 2021, then provide individual budget sheets accounting for the portions of the total budget that are expected for each of the calendar years.