



DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

Nondestructive Evaluation Techniques for Assessing Alkali-Silica Reaction Degradation of Concrete Consortium

AGENCY: National Institute of Standards and Technology

ACTION: Notice; Request for Information

SUMMARY: The National Institute of Standards and Technology (NIST) is establishing the Non-destructive Evaluation Techniques for Assessing alkali-silica reaction (ASR) Degradation of Concrete Consortium (“Consortium”) and invites organizations to participate in this Consortium. The Consortium will examine non-destructive evaluation (NDE) technologies that can be used to determine the presence and the evolution of ASR in concrete members. This notice is the initial step for the Consortium to provide participants’ access to NIST concrete specimens constructed as large reinforced concrete blocks with ASR reactive aggregates (“NIST ASR Specimens”). Participants will use NIST ASR Specimens to determine whether NDE technologies are effective in identifying and quantifying degree of expansion and degradation of

concrete members due to ASR. Participation in this Consortium is open to all eligible organizations, as described below.

DATES: NIST will accept responses for participation in this Consortium from prospective participants until [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION OF NOTICE].

ADDRESSES: Information in response to this notice and requests for additional information about the Consortium can be directed via mail to Fahim Sadek, NIST Consortium Manager, Engineering Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Mail Stop 8611, Gaithersburg, Maryland 20899, or via electronic mail to fahim.sadek@nist.gov.

FOR FURTHER INFORMATION CONTACT: For further information about partnership opportunities or about terms and conditions of NIST's Cooperative Research and Development Agreement (CRADA), please contact Honeyeh Zube, CRADA and License Officer at the National Institute of Standards and Technology's Technology Partnerships Office, by written correspondence to 100 Bureau Drive, Mail Stop 2200, Gaithersburg, Maryland 20899, by electronic mail to honeyeh.zube@nist.gov, or by telephone at (301) 975-2209.

SUPPLEMENTARY INFORMATION: ASR is a concrete degradation mechanism in which the alkalis that are typically found in Portland cement react with certain amorphous or microcrystalline siliceous phases in the aggregate and, in the presence of moisture, form an expansive gel. The gel generates macroscopic expansions within the concrete, which causes the concrete to crack and change its mechanical properties. NIST and the Nuclear Regulatory Commission

(NRC) are engaged in ongoing research to develop a standardized method for quantifying the degree of degradation resulting from ASR. NIST's research includes the construction of four large reinforced concrete specimens with a length of 16 feet and a cross section of 3.5 feet by 6 feet. Three of the specimens will be cast with reactive aggregates resulting in low-, mid-, and high-ASR expansion, while the fourth specimen will be cast with non-reactive aggregates. The NIST ASR Specimens will be conditioned in a large curing chamber at the NIST, under controlled temperature and humidity, for a duration of three (3) years.

The purpose of this Consortium is for participants to evaluate technologies that can be used to quantify the magnitude and evolution of expansion and degradation in structural concrete members. The intent is for eligible participants to use the NIST ASR Specimens as a testbed, free of charge, for experimenting with various non-invasive, non-destructive techniques to detect and monitor the progress of the concrete degradation over time.

To ensure safe laboratory procedures, each participant will need to conduct his/her operations in a manner consistent with NIST's safety policies and procedures. The participant will need to provide information regarding the technical qualifications of his/her personnel who would conduct laboratory work at NIST ("Participant Project Team"). Furthermore, the participant will need to provide a proposed safety standard operation procedure (SSOP) that would require approval from the NIST Consortium Manager. Each participant will be responsible for its Participant Project Team. Each member of the Participant Project Team working in the laboratory housing the NIST ASR Specimens will be required to take a one-time laboratory safety awareness training by NIST prior to accessing the laboratory. This training will require

less than two (2) hours, and may take place before the first day of the Participant's Project Team's scheduled access to the NIST ASR specimens.

To minimize disruption to NIST's ongoing laboratory work, participants' access to the specimens will be limited. Because the kinetics of the expansion cannot be predicted accurately, NIST may not be able to provide the participants with advance notice regarding the availability of the NIST ASR Specimens to the participants for measurements. NIST will inform the participants only after the specimen undergoes a measureable change in expansion. Unless a periodic access schedule is already in place between NIST and a participant, the participant would need to be able to arrive, set-up, and conduct its measurements with as little as one (1) week of notice. In general, it is expected that the NIST ASR Specimens will be available to the participants for measurements about one (1) month after casting of the NIST ASR Specimens, and periodically for the three (3) months thereafter. NIST also intends to provide each participant with one (1) day per scheduled visit to set up the NDE equipment and to complete data collection. Participants must not employ NDE measurement processes that can alter the physical or chemical state of the existing concrete blocks.

Any data and intellectual property resulting from the research under this Consortium will be owned by the party that developed the data or intellectual property. NIST will not seek any patent protection on any invention conceived by NIST employees under this Consortium. Each participant in the Consortium will be required to inform NIST of any intellectual property developed by the members of its Participant Project Team in the performance of the research under this Consortium. Any intellectual property conceived by a member of its Participant

Project Team will be subject to a non-exclusive, non-transferrable, paid-up license to practice to have practiced the intellectual property for government purposes, including research purposes. Each participant may use its own results for internal research, but a participant may not disclose the results to the public or any other third party without the prior written permission of NIST Consortium Manager.

Participation Process: Eligibility will be determined by NIST based on the information provided by prospective participants in response to this notice on a first-come, first-serve basis. All participants will be required to sign the Cooperative Research and Development Agreement (CRADA) for this Consortium, and each participant will be bound to the same terms and conditions in consideration of participation in the Consortium. Participants will not be required to contribute any funds or pay any fee. NIST will evaluate the written responses from prospective participants to determine eligibility to participate in this Consortium. Prospective participants should provide the following information to NIST's Consortium Manager:

- (1) Can the NDE technology quantify, or does it have the potential to quantify, the mechanical properties of the concrete throughout the reinforced concrete block?
- (2) Can the NDE technology quantify, or does it have the potential to quantify, the degree of expansion/crack development throughout the reinforced concrete block?
- (3) Can the NDE technology quantify, or does it have the potential to quantify, the degree of the ASR reaction throughout the concrete block?
- (4) Can the NDE technology quantify, or does it have the potential to quantify, the degree of expansion/stress on the surface of the reinforced concrete block?

A responding organization should not include any business proprietary information in its response to this request for information. NIST will not treat any information provided in response to this request as proprietary information.

Phillip Singerman
Associate Director for Innovations and Industry Services

[FR Doc. 2016-08418 Filed: 4/12/2016 8:45 am; Publication Date: 4/13/2016]