

## **Scope of Work**

### **Inspection Methods and Techniques to Determine Non-visible Corrosion of Prestressing Strands in Concrete Bridge Components**

#### **Task 1) Literature Review and Best Practices Analysis**

The researcher will review previous work done on this topic, including work in developing countries.

Literature Search – A preliminary literature search indicates that several initiatives have been undertaken to: 1) study chloride penetration of concrete and resulting corrosion of prestressing steel, 2) prepare step-by-step procedures for assessing the condition of corrosion-damaged bridge elements, 3) develop procedures for restoring the strength of concrete bridge superstructures, and 4) studying the behavior of reinforced concrete bridge elements with corroded/exposed prestressing strands and the effectiveness of repairs.

This work was sponsored, in part, by a host of organizations including the Transportation Research Board and the Federal Highways Administration.

While this work benefits the study, a need exists to be able to predict the state of potential corrosion in reinforcing steel (prestressed steel) while minimizing the cost in terms of time and dollars. A study of existing literature will help to focus the research towards resources that could lead to probable inspection methods, techniques, and equipment.

An additional search will be made to identify literature that may describe techniques and/or equipment that can quantify remaining prestress strands that remain hidden from inspection.

*Deliverable – Synthesis Report*

#### **Task 2) Special Conditions for Applying Methodologies, Techniques, and Equipment**

It is anticipated that any resulting solutions will be highly dependent on state-of-the-art technology. The level of technology anticipated along with the methods and techniques will likely require training and skill development of the user. The researcher will propose special training and levels of certification necessary to ensure accurate and reliable results are achieved when evaluating hidden reinforcing. The researcher will also develop specifications and prepare sample bid documents to allow bridge owners to contract for the services described herein.

*Deliverable – Training Plan describing skills, knowledge and abilities necessary to attain task force defined certification levels.*

### **Task 3) Develop Selection and Ranking Criterion**

Selection and Ranking – The researcher will compile a list of likely candidate methods, techniques, and equipment and perform further investigation to update information based on current practices and technology. The researcher will also investigate emerging technology that might be used in detecting corrosion of hidden reinforcing steel used in prestressed concrete. A report will be prepared that discusses the advantages and disadvantages the candidate methods, techniques, and equipment as they relate to detecting corrosion of hidden steel reinforcing. The researcher will then rank the candidate methods, techniques and equipment in order of efficiency and effectiveness of the resulting findings to providing the needed information. The researcher will test the selected candidates to validate the top three and finalize the ranking order. The ranking system must allow the methods, techniques, and equipment to be integrated to assist bridge owners in making informed cost effective and timely decisions regarding bridge load ratings and resulting repair/replacement.

*Deliverable: Task Report*

### **Task 4) Present the research findings to AASHTO Subcommittee on Bridges and Structures Technical Committee T-18 Bridge Management, Evaluation and Rehabilitation**

The researcher will present a draft report of the findings to the AASHTO Subcommittee on Bridges and Structures Technical Committee T-18 Bridge Management, Evaluation and Rehabilitation for consideration. Any special pieces of equipment proposed as part of the process of evaluating prestressed concrete bridge components will be on display and presented during the conference. The committee will solicit member states and/or sponsoring agencies to develop and execute certain pilot projects to validate and refine the proposed methods, techniques and equipment (e.g., system evaluation could be accomplished, in part, by using the decommissioned beams from the PENNDOT I-70 bridge replacement that are stored in Washington County, Pennsylvania).

*Deliverable: Presentation of findings to the AASHTO Subcommittee on Bridges and Structures*

### **Task 5) Draft Final Report Development**

The research will revise as needed, based on verification and testing by various member states of T-18 and consultants, the information analyzed to date.

The researcher will update the draft report by incorporating comments and suggestions from committee members. The researcher will also follow up any further research required based on results of field testing and verification of proposed methods, techniques, and equipment.

*Deliverable – Draft final report*

### **Task 6) Develop Final Report**

A final report will be prepared and submitted to the joint research task force for final review and approval. The final report will be copied and distributed to sponsoring agencies and member states.

*Deliverable – Final report*