

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): **Wisconsin DOT**

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # TPF-5(432)		Transportation Pooled Fund Program - Report Period: <input type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input checked="" type="checkbox"/> Quarter 4 (October 1 – December 31)	
Project Title: Bridge Element Deterioration for Midwest States			
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Lead Agency Project ID: 0092-19-40	Other Project ID (i.e., contract #): N/A	Project Start Date: December 3, 2019	
Original Project End Date: December 2, 2021	Current Project End Date: December 2, 2021	Number of Extensions: 0	

Project schedule status:

X On schedule On revised schedule Ahead of schedule Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Percentage of Work Completed to Date
\$399,317	\$3,627.82	2%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
\$3,627.82 / 1%	\$3,627.82	4%

Project Description:

Scope

The objective of this pooled fund research is to have multiple Midwest DOTs pool resources and historic Midwest DOT bridge data related to element level deterioration, operation practices, maintenance activities and historic design/construction details. This data will provide the basis for research to determine bridge deterioration curves. A select number of deterioration curves will provide needed utility for the time-dependent deterioration of bridge elements to be used in making estimates of future conditions and work actions. This effort will pool data and through the analysis and research processes create results that will improve accuracy of various bridge management and asset management applications that the member DOTs use (AASHTO BrM, Agile Assets and others).

This study is sequenced into three tiers based on the priorities of the DOTs:

Tier 1 National Bridge Elements (NBE) & National Bridge Inventory (NBI) Components:

- Develop element level deterioration curves for Reinforced Concrete Deck.
- Develop element level deterioration curves for Reinforced Concrete Slab.
- Develop deterioration curves for NBI component items (i.e. bridge deck, superstructure, and substructure).
- Develop element level deterioration curves for Reinforced Concrete Deck after a major preservation activity such as mill and overlay with rigid concrete wearing course.
- Develop predicted improvement in condition of Reinforced Concrete Deck element after a major preservation activity such as mill and overlay.
- In addition to probabilistic deterioration curves, also develop select deterministic deterioration curves.

Tier 2 Bridge Management Elements (BME) & Remaining NBE Elements

- Develop element level deterioration curves for each type of wearing surface (bare concrete, sealed concrete, thin polymer overlay, Polyester Polymer Concrete (PPC) overlay, ridged concrete overlay, Polymer Modified Asphalt overlay, and asphalt overlay with membrane).
- Develop element level deterioration curves for Strip Seal Deck Joints and Modular Deck Joints.
- Determine defect level deterioration curves that describe defect development and progression (e.g., cracking and delamination).
- Develop deterioration curves for Paint system (protective steel) effectiveness.
- Develop defect level deterioration curves for Steel Girder corrosion, and correlate to Paint system effectiveness; specifically, how long from new paint to 75% and 50% effective and end of life.
- Develop element level deterioration curves for substructure elements in harsh environments (e.g., pier caps under expansion joints, pier columns in spray zone from snow plows, etc.).

Tier 3 Similar Agency Defined Elements (ADE) & Inspection Related

- Identify Agency Defined Elements (ADE) that would be of use for other Midwest DOTs to consider adopting.
- Determine what type of inspection information related to Nondestructive Evaluation (NDE) Midwest DOTs have and how it is used that translates into information on element level defects (Ground Penetrating Radar (GPR), Infrared Thermograph, or other).
- Provide summary of policy, guidance, and practices that Midwest DOTs employ to relate NDE results to defect reporting (to describe delamination and deterioration) and how DOTs use NDE to make quantifiable inspection and actionable work actions for concrete bridge decks.

Expected Findings and Benefits

The project will deliver the following items:

- Literature review which will detail the current state of the practice for bridge deterioration modeling and will include the literature review, a survey, and targeted interviews.
- Data screening procedure. This will allow participating States to help understand the validity of their data and its pros and opportunities for improvement.
- A populated and documented open source database and analysis engine which the States can use to explore and model their data or data from other States in an easy to use interface.
- Tier 1 models.
- Tier 2 models.
- Ties 3 information.

Overall the main thrust of this project is to produce deterioration models to fuel the analysis of bridge performance for selected items.

The activities, tools, practices, policies or methods in partner states that would be impacted by the research findings include:

- Bridge management practices and policies
- Deterioration modeling of bridge components
- Deterioration modeling processes which can be applied to other element level bridge components
- Development of defensible system performance targets
- Development of bridge work plans
- Performance of risk analysis to determine which bridges are more at risk from a condition standpoint
- This project will provide participating States strengths and opportunities of improvement in their data collection polices, procedures, and methods

The primary benefit of this project to the participating States is the ability to plug the resultant models into their asset management systems and immediately begin to use the data to make better, data driven decisions. A secondary benefit of this project is the provision of the online database and analysis engine that will be designed for the participating States to run their own analysis at the NBI level or NBE level using their States data, a portion of the participating States data, national data or some other permutation. This will empower the participating States to explore the data and come up with deterioration models as new data are available or new analysis concepts are uncovered.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Task 1 – Project Management

The contract began during the reporting period. A kickoff meeting and development of a detailed work plan which were planned activities of the project were completed prior to the official start of the project.

This task is 30% complete. No problems have been encountered to-date.

Task 2 – Literature Review

We began the literature review process. This effort will pick up intensity during the next quarter.

This task is 5% complete. No problems have been encountered to-date.

Task 3 – Data Collection

Although this task was not scheduled to begin until late in the first quarter 2020, the Lead State and the project team began this task since it is a critical part of the project. A data request was developed and a data submittal portal was created. A call was held with the participating States to discuss and finalize the data request. The States began data population.

This task is 10% complete. No problems have been encountered to-date.

Task 4 – Develop Data Screening Procedure

No work was conducted on this task during the reporting period. This task is 0% complete.

Task 5 – Develop Data Management Policy

No work was conducted on this task during the reporting period. This task is 0% complete.

Task 6 – Develop Tier 1 Deterioration Curves

No work was conducted on this task during the reporting period. This task is 0% complete.

Task 7 – Develop Tier 2 Deterioration Curves

No work was conducted on this task during the reporting period. This task is 0% complete.

Task 8 – Develop Tier 3 Inputs

No work was conducted on this task during the reporting period. This task is 0% complete.

Task 9 – Final Project Deliverables

No work was conducted on this task during the reporting period. This task is 0% complete.

Anticipated Work Next Quarter:

Task 1 – Project Management

We will issue a progress report and invoice. We will initiate monthly status calls with the participating States.

Task 2 – Literature Review

The literature and interviews will be completed and a draft synthesis delivered.

Task 3 – Data Collection

The data collection process should be substantially completed. This is a critical path item. We will progress with the following data collection activities:

- Develop Familiarity with Participating States Inspection and Coding Methods
- Compare State Inspection and Coding Practices
- Collect Data from DOTs
- Determine Method to Collect Construction History Data
- Collect State DOTs Construction/Preservation/Maintenance Practices
- Evaluate National NBI/NBE Data

This task is scheduled for completion during Quarter 2 of 2020.

Task 4 – Develop Data Screening Procedure

No work is anticipated on this task during the reporting quarter.

Task 5 – Develop Data Management Policy

No work is anticipated on this task during the reporting quarter.

Task 6 – Develop Tier 1 Deterioration Curves

No work is anticipated on this task during the reporting quarter.

Task 7 – Develop Tier 2 Deterioration Curves

No work is anticipated on this task during the reporting quarter.

Task 8 – Develop Tier 3 Inputs

No work is anticipated on this task during the reporting quarter.

Task 9 – Final Project Deliverables

No work is anticipated on this task during the reporting quarter.

Significant Results:

The project just began, there have been no significant results.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

None have been identified to date.

Potential Implementation:

The project is just beginning, there are no potential implementation activities identified but multiple are expected by the time the project is completed.

