Federal Contract # DTFH61-17D00001 – Task Order #2

LONG-TERM BRIDGE PERFORMANCE PROGRAM

PROGRESS REPORT NO. 13

Report Period: October 1, 2018 – October 31, 2018

Prepared For:

Federal Highway Administration

Prepared By:

A. Account of work performed in this period

1. Coordination and Meetings Between the Contractor and FHWA LTBP Team

The Rutgers team had a few correspondences with the FHWA team over the phone or by email. Furthermore, the Rutgers team had a web conference meeting with Dr. Zobel on October 31st.

Co-PI: 6 hours

Program Manager: 9 hours

Staff Engineer: 10 hours

2. Develop LTBP Program bridge performance strategic research matrix

In the month of October, work continued on the strategic research application (Task 2.3) presented to and approved by FHWA on June 20th, 2018. It is estimated that Task 2.3 is 80% complete at this time. Subtasks and their percent completion are as follows:

Task 2.3.1 – *Develop/finalize pipeline for automated data retrieval and storage* (90% Complete):

A working pipeline for data retrieval from the TRID database has been developed. In the month of July, the Rutgers team investigated an additional data source (National Transportation Library) per a suggestion from FHWA on the June 20th meeting. It was determined that NTL provided little additional information and therefore would not be included in the SRMs, however, it should be noted that development of a pipeline for data retrieval from NTL is feasible if it is decided this resource should be included in future versions of the SRM application.

Task 2.3.2 – *Create the SRM database schema to store research project data* (100% Complete):

At this time, this task is complete. It is anticipated that any additional work on this task will include the refinement of database schema for any additional data sources that may be requested.

Task 2.3.3 – *Populate SRM database using data retrieval/storage pipeline* (100% Complete):

At this time, this task is complete. It is anticipated that any additional work on this task will include the refinement of database schema for any additional data sources that may be requested.

Task 2.3.4a – *Identify all known current and planned research efforts related to bridge performance research topic areas* (Ongoing, 30% Complete):

Work on this task began in June with the development of the proof of concept SRM application that was presented to FHWA on June 20th, 2018. This task will progress concurrently with the development of the proposed SRM application.

Task 2.3.4b – *Create frontend interface to visualize and explore the data collected and stored in the SRM database* (80% Complete):

A proof of concept web interface was presented to FHWA on June 20th which received positive feedback and approval from FHWA to move forward. Work in the month of October included further development of the SRM interface as per the implementation strategy proposed. A working interface was presented to FHWA during the web conference held on October 31st.

Co-PI: 2.5 hours

Staff Engineer: 155 hours

Technician: 50.03 hours

3. **Conduct training for all field personnel on LTBP Protocols**

Videos from the previous event was compiled. These videos will be provided to the FHWA.

Co-PI: 1.5 hours

4. **Development of data collection protocols and RABIT-CE operations manual**

Nothing was done during this period. However, there are some charges from June related to Pennoni's work on this task.

Senior Engineer: 6 hours

5. **Legacy Data Mining data extraction**

The LDM group accomplished the following tasks for the month of October:

- All initial data extraction from bridge plans has been completed, the combined data extraction excel sheet is ready for the first upload trial to InfoBridge (Task is 100% complete).
- Continued to perform quality control and quality assurance on all extracted data through organization and review of collected data in order to improve data accuracy as well as clarity.
- Data collection has continued for all recently added fields relating to moment of inertia with the primary focus being on data extraction for steel plate girder dimensions from the bridge plans. Data extraction has also continued for rolled steel girder shapes as well as specific PS concrete shapes from the bridge plans in order to provide more structural properties for these girders.
- The following fields are being calculated using all data extracted from the newly added steel/PS girder fields:
    o Moment of inertia of noncomposite section
    o Moment of inertia of composite section (if applicable)

- Stiffness of superstructure
- Load distribution factors

6. Organize, conduct, and participate in LTBP workshops and meetings

Nothing was done during this period.

7. Publications, website, communications, and technical assistance

The Rutgers team prepared the electronic version of the monthly progress report and submitted it to FHWA. Moreover, the Rutgers team developed a MS Project file showing the project milestone and submitted it to FHWA.

Additionally, during this month, Dr. Babanejad worked on enhancing the quality of NDT data, which was collected throughout the LTBP program. Specific subtasks are listed as follows:

Reprocessing the Problematic Test Results – Some of the NDT test results were skeptical. This activity was started in July, however, it continued to October. Over 95% of this task was completed by the end of October. From almost 280 tests, 7% of those were identified to be problematic. Due to the uncertainties associated with debugging the problematic test results, the exact timeline for this task could not be set perfectly. Saeed also started working on the problematic XML raw data. Some of those have wrong coordinates and need to be addressed soon.

It should be noted that as the entire task progresses, multiple subtasks are identified. The scopes of all these subtasks and required actions are periodically discussed with COR for confirmation.

Co-PI: 17.5 hours

Program Manager: 18 hours

Staff Engineer: 98 hours

Technician: 30

Project Support: 21 hours

B. Work to be accomplished during the next period

1. **Coordination and Meetings Between the Contractor and FHWA LTBP Team**

   The Rutgers team will meet with reach out to FHWA to set up a meeting for the month of November.

2. **Develop LTBP Program bridge performance strategic research matrix**

   Work efforts in the month of November will continue for Task 2.3.4: (a) implementation and refinement of queries to the SRM database for searching and classifying all known current and planned research efforts (projects and publications), and (b) implementing interface components (as needed) in order to satisfy the objectives of SRM task. The SRM web application will be tested and made available to FHWA for review.

3. **Conduct training for all field personnel on LTBP Protocols**

   The Rutgers team will provide the videos and documents from the previous protocol training to FHWA.

4. **Development of data collection protocols and RABIT-CE operations manual**

   No work is planned under this task for the next reporting period.

5. **Legacy Data Mining data extraction**

   No work is planned under this task for the next reporting period.

6. **Organize, conduct, and participate in LTBP workshops and meetings**

   No work is planned under this task for the next reporting period.

7. **Publications, website, communications, and technical assistance**

   The Rutgers team will prepare the electronic version of the monthly progress report and will submit it to FHWA. Moreover, the Rutgers team will submit the updated MS Project file to FHWA.

   .

C. Problems/Recommended Solutions

None.

D. How the results of the work performed supports one or more of the FHWA, DOT and LTBP Goals

The following is a summary of how the work performed on the primary tasks of this task order contribute to meeting the FHWA, DOT, and LTBP program goals.

Task 2 - Develop LTBP Program bridge performance strategic research matrix

Fundamentally, the SRMs aim to link the LTBP program to the larger research community. By placing the LTBP efforts in this larger context, the program will be able to identify potential synergies and collaborative opportunities as well as any overlaps that may exist. This will both increase the cost effectiveness of the program as well as the program's impact on bridge engineering practice through clearly showing how the LTBP program contributes to the overall bridge performance research landscape.

Task 3 - Conduct training for all field personnel on LTBP Protocols

At the heart of the LTBP program's data collection effort is the requirement that data be obtained in a consistent and reliable manner across the breadth of the program. Variations in collection techniques or unreliable practices would pollute the data streams and greatly limit the ability of the program to meets its goal of improving our understanding of long-term bridge performance. Activities under this task aim to ensure that the data collection efforts of the LTBP program are executed by teams with the required expertise to obtain consistent and reliable data.

Task 4 - Development of data collection protocols and RABIT-CE operations manual

Similar to the training work being conducted under Task 3, this task is also involved in ensuring consistent and reliable data collection throughout the program. Specifically, this task will develop additional protocols and operations manuals that specify best-practice approaches for data collection.

Task 5 - Legacy Data Mining data extraction

In addition to ensuring consistent and reliable data collection efforts, the overarching goal of the program is also dependent upon the completeness of the data collection efforts. This task contributes to this through the collection of available legacy data. This data not only provides a means to ensure field data collection efforts are carried out efficiently (i.e. on bridges best suited to meeting the program's goals) but also provides context to the data to help explain observed trends and correlations (and thus further our understanding of long-term bridge performance).

E. Purchases and Rentals

Nothing was purchased during this period.

F. Travel Details for Reporting Period

None.

G. Current and Cumulative Expenditures (cost shown includes benefits and overhead)

Institution	Current Expenditures 10/1/2018 – 10/31/2018	Cumulative Expenditures 10/1/2017 – 10/31/2018
Rutgers, the State University of New Jersey	$ 31,143.00	$ 772,504.59
Bridge Intelligence LLC	$ 3,575.00	$ 76,576.39
Pennoni Associates	$ 1,068.00	$ 34,206.00
Infratek Solutions	$ 0	$ 25,244.00
New Jersey Institute of Technology	$ 3,452.07	$ 26,285.10

H. Subcontractor's Progress Report

LTBP TSSC
Federal Contract # DTFH61-17-D00001

PROGRESS REPORT NO. 10
For the Period from 10/1/2018 through 10/31/2018

A. Accomplishments/Work Performed

The following is a complete account of all accomplishments and work performed on each task during this reporting period.

Task 1: (Coordination and Meetings between the Rutgers and FHWA LTBP Team)

During this period, Mr. Parvardeh corresponded with multiple emails regarding communications with the FHWA team. Furthermore, Mr. Parvardeh developed slides for the web conference meeting with FHWA on the 31st of October and attended the 2 hours web conference.

Number of hours during this period: 6 hours

This task is approximately 75% complete.

Task 2: (Develop LTBP Program Bridge Performance Strategic Research Matrix)
During this period, Mr. Parvardeh assisted Mr. Romano with the development of the web based tool for the strategic research matrix.

Number of hours during this period: 2.5 hours

This task is approximately 75% complete.

Task 3: (Conduct Training on Proper Use and Application of LTBP Field Assessment Protocols)

During this period, Mr. Parvardeh compiled the videos which were taken from the privous protocol training in 2016.

Number of hours during this period: 1.5 hours

This task is approximately 35% complete.

Task 4: (Development and Refinement of Data Collection Protocols)

Nothing was done during this period.

Number of hours during this period: 0 hours

This task is approximately 90% complete.

Task 5: (Legacy Data Mining Data Extraction and Upload)
Nothing was done during this period.

Number of hours during this period: 0 hours

This task is approximately 100% complete.

Task 6: (Organize, Conduct, and Participate in LTBP Workshops and Meetings)

Nothing was done during this period.

Number of hours during this period: 0 hours

This task is approximately 10% complete.

Task 7: (Publication, Website, Communication, and Technical Assistance)

During this period, the Bridge Intelligence team performed the following tasks:

- Prepared and submitted monthly progress report for June including updated MS project
- Provided the NDT data requested by the FHWA NDE team.
- Provided assistance with the preparation of NDT data for FHWA.

Number of hours during this period: 17.5 hours

This task is approximately 90% complete.

B. Work Anticipated During the Next Period

For the next period, the Bridge Intelligence team will work with the Rutgers team to satisfy the FHWA requirements.

C. Changes /Problems

None.

D. Participants & charged Level of Efforts

Personnel Name	Role/Contribution	Total Hours	Billed Cost
Hooman Parvardeh	Principal	37.5	$ 3,575

Below is a breakdown of level of effort per task:

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Total
6 hrs	2.5	1.5 hrs	0	0	0	27.5 hrs	37.5 hrs

E. Travel
None.

Sub-recipient Name: New Jersey Institute of Technology
Subaward No: 00000289
Principal Investigator: Matthew J. Bandelt

LTBP TSSC – Task Order 2
Federal Contract # DTFH61-17-D00001
For the Period from 10/1/2018 through 10/30/2018

A. Accomplishments/Work Performed

The following is a complete account of all accomplishments and work performed on each task during this reporting period.

Task 2: LTBP Program Strategic Research Matrices

The NJIT team continued assisting Rutgers on the development of strategic research matrices by developing relationships for bridge decks (treated and untreated), deterioration mechanisms, preservation and maintenance actions, environmental and live-load conditioning, and bridge joints.

Number of hours during this period: 50

Task 3: Training Curriculum
No work was completed on this task during this period.

Number of hours during this period: 0 hours.

Task 4: Development and Refinement of Data Collection Protocols

No work was completed on this task during this period.

Number of hours during this period: 0 hours.

B. Work Anticipated During the Next Period

For the next period, the team at NJIT will continue to assist and work on directed documents as directed by Rutgers and FHWA.

C. Changes /Problems

None.

D. Participants & charged Level of Efforts

Personnel Name	Role/Contribution	Total Hours	Billed Cost
Aaron Strand	Technician	50	$69/hour

Task 2	Task 3	Task 4	Total
50 hrs	0	0	50 hrs

E. Travel
None.