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

**LONG-TERM BRIDGE PERFORMANCE PROGRAM**

PROGRESS REPORT NO. 9

Report Period: June 1, 2018 – June 30, 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 meeting with FHWA on 6/20th at TFHRC. The minutes of the meeting was submitted to the FHWA personnel present at the meeting.

Staff Engineer: 78.75 hours

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

A proof of concept for the proposed strategic research tool was implemented and presented to FHWA in the month of June as part of Task 2.3. Subtasks and their percent completion are as follows:

Task 2.3.1 – Develop/finalize pipeline for automated data retrieval and storage (80% Complete):

A working pipeline for data retrieval from the TRID database has been developed. During the June 20th meeting with FHWA, an additional data source (National Transportation Library) was suggested. While this task is nearly complete for TRID, it is anticipated that additional work for this task will include updating the data pipeline to retrieve data from the National Transportation library, if necessary.

Task 2.3.2 – Create the SRM database schema to store research project data (80% Complete):

This task is nearly complete. It is anticipated that any additional work on this task will include the refinement of database schema for additional data sources (e.g. NTL) if necessary.

Task 2.3.3 – Populate SRM database using data retrieval/storage pipeline (80% Complete):

This task is nearly complete. The SRM database has been created and populated with data from TRID. Additional work on this task will only be required if it is decided that other data sources should be included (e.g. NTL).

Task 2.3.4a – Identify all known current and planned research efforts related to bridge performance research topic areas (Ongoing, 20% 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. It is anticipated that 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 (20% Complete):

A proof of concept web interface was developed and presented to FHWA on June 20th. With positive feedback and approval from FHWA to continue implementing the proposed SRM framework, the interface is being developed concurrently with Task 2.3.4a.

PI: 41 hours

Co-PI: 6 hours

Project Engineer: 41.88 hours

Staff Engineer: 157.5

Technician: 29.55

Project Support: 17 hours

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

Efforts in June were focused on (1) updating the existing training material to be consistent with the current LTBP Protocol standards and (2) expanding the existing protocols training material to compliment the planned data collection activities for 2018. The original training material consists of two days of presentations. The original training was conducted in October of 2014 when many of the protocols were still in draft form. The first day was held in two sessions and the second day held in three sessions. Bridge documentation, planning and logistics, data storage & meta data collection and site preparation are discussed in the morning session of the first day and material sampling is discussed in the afternoon session of the first day. The second day contains three sessions. Visual inspection is covered in the morning session, and visual inspection and non-destructive evaluation is covered in the afternoon sessions. Professional quality video was taken during the presentations and is available for distribution.

The following tasks were visited/revisited in June:

* Reviewed LTBP data collection protocols relevant for current data collection plan
* Reviewed current training material and coursework. This involved critical review of two full days of training material inclusive of written documents, PowerPoint slides, and previously recorded lectures.
* Held meetings with team members to plan revision and expansion current draft of protocol training
* Began planning and drafting expansion of protocols training coursework to include a hands-on "workshop" portion. The hands-on portion of the coursework is meant to compliment and reinforce the lecture material. Additionally, it aims to present many of the same problems commonly encountered in the fiend in hopes to provide a robust and diverse training experience that is similar to the expected environment.
* Reviewed raw/native data sets of NDE technologies previously collected in the LTBP data collection activities in an effort to provide details regarding the documentation, storage, and reporting of collected data and meta data
* Drafted preliminary schedule and timeline of training

The team expects to finalize the protocols training in July.

Staff Engineer: 78.75 hours

Project Support: 2 hours

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

Nothing was done during this period.

* 1. **Legacy Data Mining data extraction**

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

* All data extraction from bridge plans has been completed, the combined data extraction excel sheet is now 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 all data in order to improve data accuracy as well as clarity.
* Fields have been added for steel plate girder dimensions as well as moment of inertia for all girders. Preparations have been made to begin data collection for these fields.
* Continued to periodically work on creation of the BLOB (Binary Large Object) files from the collected bridge documentation for possible future implementation into Bridge Portal.
* Miscellaneous updates and fixes to the bridge structure numbers and other fields were made in order to have a smoother upload process of the extracted data to Bridge Portal server.

CO-PI: 6 hours

Project Engineer: 86.25 hours

Staff Engineer: 78.75 hours

Technician: 26 hours

Project Support: 17 hours

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

No work was performed for this task.

* 1. **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.

The Bridge Intelligence team worked on converting and uploading the XML and reports from OR and WA RABIT testing to Bridge portal per FHWA request. The detail is in the subcontract section.

Co-PI: 90.5

Project Support: 22 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 July.

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

In July, the Rutgers team will conduct a review of the National Transportation Library (NTL) and decide if it is necessary to include as a data source. If it is determined that NTL provides additional information not obtained from TRID, the Rutgers team will utilize the same process framework to develop a pipeline for data retrieval (Task 2.3.1), create the schema (Task 2.3.2), and populate the SRM database (Task 2.3.3) with data from NTL. Otherwise, work efforts in the month of July will focus on Task 2.3.4: (a) implementation and refinement of queries to the SRM database in order to begin to identify all known current and planned research efforts, and (b) implementing interface components (as needed) in order to satisfy the objectives of SRM task.

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

The Rutgers team will wait to hear about possible needs for training the HDR team from FHWA.

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

The Rutgers team is still waiting for any possible comment from FHWA. Upon receiving any comment, the Rutgers team will work on providing answers.

* 1. **Legacy Data Mining data extraction**

For the month of July, the group will continue to work on all of the items mentioned before with more of a focus on reviewing the collected data and gathering data on the newly added fields related to girder details. The group’s efforts will primarily be on performing efficient and accurate data collection of the new fields related to the important girder details that were discussed in the June progress meeting. Statistics will also be collected from previously extracted data to help better understand where any issues may lay. Analysis will continue to be done on the data collected to ensure it is of the highest quality and is being represented as accurately as possible on the Bridge Portal website.

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

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

* 1. **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.

The Rutgers team will work on the tasks related to Bridge Portal as they are requested by FHWA.

**C. Problems/Recommended Solutions**

The Rutgers team is still waiting to receive comments from the COR for the report submitted for task 4 (protocols). Due to not receiving the comments/feedback from the COR, there will be delays in the delivery of this task.

**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)**

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| --- | --- | --- |
| **Institution** | **Current Expenditures**  **6/1/2018 – 6/30/2018** | **Cumulative Expenditures**  **10/1/2017 – 6/30/2018** |
| Rutgers, the State University of New Jersey | $ 62,895.25 | $ 502,067.09 |
| Bridge Intelligence LLC | $ 13,325.00 | $ 62,146.39 |
| Pennoni Associates | $ 0 | $ 33,138.00 |
| Infratek Solutions | $ 0 | $ 25,244.00 |
| New Jersey Institute of Technology | $ 7,357.71 | $ 13,631.02 |

**H. Subcontractor’s Progress Report**