TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Date: March 31, 2021

Lead Agency (FHWA or State DOT): Indiana 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 # *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* ***TPF 5-436***	**Transportation Pooled Fund Program - Report Period:** X Quarter 1 (January 1 – March 31) ☐ Quarter 2 (April 1 – June 30) ☐ Quarter 3 (July 1 – September 30) ☐ Quarter 4 (October 1 – December 31)

Project Title: **Development of Criteria to Assess the Effects of Pack-out Corrosion in Built-up Steel Members**		
Name of Project Manager(s): **Tommy E. Nantung**	**Phone Number:** **(765) 463-1521 ext. 248**	**E-Mail** tnantung@indot.in.gov
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:** 9/1/2019
Original Project End Date: **8/31/2022**	**Current Project End Date:** **8/31/2022**	**Number of Extensions:** None

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**
$760,000	**$162,527**	**38%**

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$34,137	**4.5%**	**41.6%**

**This total budget is based on funds that are shown as "committed" on the TPF website.

Project Description:
This study proposes to:

1) To develop AASHTO ready specifications for the evaluation of the effects of pack-out corrosion in built-up steel tension, compression, and flexural members.
2) Provide guidance on the need for repairs and corrosion rates that can be expected in various environments in order to assist owners in programming when repairs may need to be made.
3) Identify the most effective methods of repairs and provide suggesting verbiage that could be used when preparing special provisions for repairs.
4) Develop several case-study examples, including calculations that will be used for training users on the methodologies to be developed. It is anticipated that the research team will host a number of webinars or on-site training sessions to ensure technology transfer and implementation.

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

- The prototype testing is well underway. Specifically, a W24x68 with top and bottom cover plates has been tested to focus on pack-out in a compression flange. Tests included zero distortion of the cover plate as well as various levels of distortion due to simulate pack out. For this test, no section loss was introduced to isolate the effect of the pack-out. The test has yield very valuable data regarding the effect of distortion on fastener forces, local stresses, and stiffness
- The data from prototype test were used to further calibrated the FEA studies. Presently, excellent agreement between the laboratory measured data and the FEA results have been observed.
- Using the above, a parametric study (experimental and analytical) will be further developed.
- Worked with INDOT to obtain members from a truss bridge with members with moderate to severe pack-out that has been taken out of service. The members will be used for experimental testing as well as studies in mitigation techniques.
- A project kick-off meeting has been scheduled for April 7, 2021 from 10:00 AM to 2:00 PM EST.

Anticipated work next quarter:

- Continue with the finite element studies and based on the results of the prototype test, develop the detailed experimental program for compression flanges;
- Obtain members from the INDOT truss with pack-out damage.
- Machine plates to simulate section loss to study the effect of section and section loss combined with pack-out distortion in compression flanges.
- Begin analytical and experimental studies on tension flanges with pack-out corrosion.
- Obtain additional members with pack-out corrosions. **If a state has such members available or coming out of service in the near future, the RT requests that they contact Robert Connor to discuss the potential for obtaining the members for the research.**
- Hold the Project Kick-off meeting

Significant Results:

1. None to date

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).

1. The COVID-19 restrictions resulted in Purdue University shutting down entirely in Mid-march 2020. All access to laboratory facilities were halted effectively bringing all research to a standstill. In mid-July 2020, the laboratory began to open back up for research. While progress has of course been significantly delayed, the Research Team is working as efficiently as possible to regain lost time.

Potential Implementation:
None to date