# TRANSPORTATION POOLED FUND PROGRAM
# QUARTERLY PROGRESS REPORT

Date: _Dec 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 #**<br>*(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)*<br>***TPF 5-436*** | **Transportation Pooled Fund Program - Report Period:**<br>☐Quarter 1 (January 1 – March 31)<br>☐Quarter 2 (April 1 – June 30)<br>☐Quarter 3 (July 1 – September 30)<br>XQuarter 4 (October 1 – December 31) |
|---|---|

| **Project Title:**<br>**Development of Criteria to Assess the Effects of Pack-out Corrosion in Built-up Steel Members** | | |
|---|---|---|
| **Name of Project Manager(s):**<br>**Tommy E. Nantung** | **Phone Number:**<br>**(765) 463-1521 ext. 248** | **E-Mail**<br>tnantung@indot.in.gov |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):** | **Project Start Date:**<br>9/1/2019 |
| **Original Project End Date:**<br>**8/31/2022** | **Current Project End Date:**<br>**8/31/2022** | **Number of Extensions:**<br>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** | **$270,734** | **55%** |

***Quarterly*** Project Statistics:

| Total Project Expenses and Percentage This Quarter | Total Amount of Funds Expended This Quarter | Total Percentage of Time Used to Date |
|---|---|---|
| **$33,498** | **4.4%** | **61.1%** |

**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 tests on small portions of members with real pack out corrosion is completed and data are being reviewed and used to calibrated FEA simulations. These specimens were subjected to compression loading to evaluate the effect of section loss and distortion on local buckling. A typical specimen with severe section loss is shown in Figure 1. These data will be used along with the data from the compression flange girder tests to begin to develop strategies to evaluate the effects of pack-out on the capacity of compression members.
- Obtained quotes for fabrication of four girders built from truss members with real pack-out. The lowest bidder was selected and the girders should be available for testing in mid-February. The specimens were sandblasted per the request of the fabricators (See figure 2), however care was taken to ensure the pack-out corrosion produce was not removed.
- Continued calibrating FEA models based on the experimental data.

**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;
- Continue analytical and experimental studies on tension flanges with pack-out corrosion.
- Begin fatigue testing of girder specimens with real 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.**

**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).**

**Potential Implementation:**
None to date


**Figure 1 – Photograph of typical compression test on stub-column section.**
**Note light shining through the areas where the corrosion has completely eaten away the cover plate and presence of loose pack-out corrosion product.**

**Figure 2 - Members ready for shipping to fabricator after sandblasting.**
**A web and top flange will be added so these former lower chords can be loaded in flexure.**