**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

Lead Agency (FHWA or State DOT): \_\_\_\_\_\_FHWA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INSTRUCTIONS:**

*Lead Agency contacts 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.*

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| **Transportation Pooled Fund Program Project #***TPF-5(484)* | **Transportation Pooled Fund Program - Report Period:** □Quarter 1 (January 1 – March 31)xQuarter 2 (April 1 – June 30)□Quarter 3 (July 1 – September 30) 2022□Quarter 4 (October 1 – December 31) |
| **TPF Study Number and Title:****TPF 5(484), DEVELOP COUNTERMEASURE STRATEGIES FOR PROTECTING BRIDGE GIRDERS AGAINST OVERHEIGHT VEHICLES IMPACT** |
| **Lead Agency Contact: Vince Chiarito** | **Lead Agency Phone Number:** **(202) 366-4621** | **Lead Agency E-Mail**vincent.chiarito@dot.gov |
| **Lead Agency Project ID:**  | **Other Project ID (i.e., contract #):****IDIQs: 693JJ323D000001 and 693JJ323D000002** | **Project Start Date:**Oct 2022 |
| **Original Project Start Date: October 2022** | **Original Project End Date:** **Oct ~ Dec 2027** | **If Extension has been requested, updated project End Date:**  |

Project schedule status:

X On schedule □ On revised schedule □ Ahead of schedule □ Behind schedule

Overall Project Statistics:

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|  **Total Project Budget** |  **Total Funds Expended****This Quarter** |  **Percentage of Work**  **Completed to Date** |
| $1,835,010.00 | 0 | 0  |

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| **Project Description**:According to the Federal Highway Administration (FHWA), over 600,000 bridges are registered in the National Bridge Inventory (NBI). Oversized vehicles, usually crossing over or under a bridge in violation of posted height limits, are among the top causes of bridge failure or collapse. A recent survey of DOTs across the country has shown that the impact damage to bridges because of over-height trucks is indeed a nationwide problem. A frequently used protection measure against over-height vehicles is the installation of laser protection systems to provide advanced warning to such vehicles approaching low clearance bridges / tunnels. However, the risk of serious damages to critical bridges / tunnels remains if the driver doesn’t follow the warning signs. Based on these facts, FHWA recently developed an energy-dissipative system prototype using a combination of a steel box beam with aluminum honeycombs for the protection of bridge girders from over-height impacts. This innovative protection device will be effective in preventing damages to concrete and steel beams, while sustaining moderate to severe damage to itself, depending on the intensity of the impact. This project focuses on the full-scale testing, field installation and evaluation of the effectiveness of this prototype against over-height truck impactsObjectivesThe innovative steel beam/honeycomb protective system is anticipated to dissipate a large portion of the energy from the colliding truck by crushing/deforming the honeycombs. The effectiveness of this device has been investigated recently by large-scale testing in collaboration with the researchers at Hunan University, where over-height impact was simulated through a drop hammer system. With the success of the large-scale testing program, the actual field installation of full-scale model is deemed necessary to validate its effectiveness to protect existing bridge structures. This project aims at the following: • Design of the full-scale testing program and selection of bridge site for the field installation; • Custom construction and installation of the full-scale model of the prototype attaching to the existing facial girder of the selected structure; • Full scale testing and evaluation of the system with actual over-height truck impact on site.Scope of WorkScope of Work: This project will carry out in two phases which include the following eleven (11) main tasks: Phase I: 1. Develop an over-height impact program for outdoor full scale testing including site & vehicles selection and logistics. 2. Investigate the protection system extensively through numerical simulations on different impact scenarios. 3. Design an effective installation of the proposed protective system including supporting systems, connections, the protective system and means for easy replacement of damaged components. 4. Design the entire setup for full-scale prototype testing including the girders to be impacted or a system supporting girder to be impacted that can represent the behavior of an actual bridge through numerical simulations. 5. Prepare and publish the Phase I report including outcomes of the tasks carried out in this phase. Phase II: 6. Conduct full-scale prototype testing to demonstrate the effectiveness of the proposed protective system. 7. Perform parametric studies on the impact performance of the protection devices installed on the prestressed /steel girders. 8. Develop a design method for proportioning the protective system to achieve a specific performance (performance-based approach). 9. Develop design examples and templates to illustrate the design of the protective system for different impact scenarios. 10. Develop new design guidelines for fascia girder to resist the impact loads due to over-height heavy vehicles without protection system. 11. Prepare and publish the final report including findings and outcomes of all the tasks completed in this project. |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**Under the first Task order an interim report 2 was received and provided to reviewers (including FHWA and state DOTContributors.  |
| **Anticipated work next quarter**:Provide review comments to authors on the 2nd interim report.Deliver a revised interim report 2 Interim report under task order #1.Post the revised 2nd interim report.  |

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| **Significant Results:****-IDIQ contract awarded. This is a five-year contract.****-Enough commitments were received during FY 22 to start the acquisition plan for the TPF study.****-The first Task order proposals were received, and evaluations completed in July 2023. The first task order was****issued in September to begin on 1 Oct 2023. The Period of Performance (POP) is from 10/01/2023 to 09/30/2026****-The first task order was initiated.****-The kickoff meeting for the first task order was held virtually on 16 Oct 2023.****-The kickoff minutes were received on 23 Oct 2023.****-The 1st interim report, “Development of Countermeasure Strategies for Protecting Bridge Girders against Over-height Vehicles Impact, Interim Report 1: Literature Review” was received, January 31, 2024.** **-The 2nd interim report** **was received: “Development of Countermeasure Strategies for Protecting Bridge Girders against Over-height Vehicles Impact, Interim Report 2: Concept Design, Revision A, June 14, 2024.** |
| **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 to report.** |

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| **Potential Implementation:** Resources and prototype designs to help stakeholders specify safe mitigation measuresagainst overhead strikes for protecting vulnerable bridges. |