TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Lead Agency: Utah Department of Transportation

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 #	**Transportation Pooled Fund Program - Report Period:**
TPF-5(542)	_ Quarter 1 (January 1 – March 31, 2025) **X Quarter 2 (April 1 – June 30, 2025)** _ Quarter 3 (July 1 – September 30, 2025) _ Quarter 4 (October 1 – December 31, 2025)

Project Title:
Passive Force Behavior for Skewed Bridge Abutments During Combined Lateral and Rotational Loading

Name of Project Manager(s):	**Phone Number:**	**E-Mail**
David Stevens	801-589-8340	davidstevens@utah.gov
Lead Agency Project ID:	**Other Project ID (i.e., contract #):**	**Project Start Date:**
FINET program 42121, ePM PIN 22358 UDOT PIC No. PL05.542	UDOT Contract No. 25-9276	April 28, 2025 (contract)
Original Project End Date:	**Current Project End Date:**	**Number of Extensions:**
April 20, 2028 (scope)	April 20, 2028 (scope)	

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
Total commitments = $385,000.00 Obligated to date = $345,000.00 Contract amount = $340,000.00 Remaining on contract = $328,733.00	Contract spent = $11,267.00 Contract support = $0.00 Total spent = $11,267.00	3%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter (contract)	Total Amount of Funds Expended This Quarter (contract)	Total Percentage of Time Used to Date (project)
3%	$11,267.00	6%

Project Description:

Building on the results of pooled fund study TPF-5(264), the objective of this new study is to assist with the calibration of numerical models by conducting a series of large-scale skewed abutment, passive force-displacement tests with enough abutment offset from rotation to evaluate the skew reduction factor and backwall pressure distribution. The maximum rotation and displacement would be larger than in the previous testing. As availability allows, the tests would be conducted at the same Salt Lake Airport test site used in the previous study.

Funded tasks for this new study include the following:

(1) Analysis of the existing abutment to determine acceptable rotation and loading scheme,
(2) Performance of large-scale skew abutment tests,
(3) Analysis of test results including determination of passive force reduction factors,
(4) Comparison with longitudinal test results and modifications,
(5) Supplemental numerical analysis of parameters affecting results,
(6a) Preparation of interim reports, and
(7a) Meetings and dissemination of early results.

Tasks to be funded in the near future with additional pooled fund contributions include the following:

(6b) Preparation of final report, and
(7b) Meetings and dissemination of final results, including presentations at AASHTO committee meetings.

In Task 2, lateral load tests will be performed on the simulated bridge abutment with skew angles of 0°, 15°, 30°, and 45° relative to the direction of loading. The backfill will consist of concrete sand compacted to 95% of the modified Proctor maximum dry unit weight to provide direct comparisons with the previous tests performed with longitudinal loading. The passive force provided by the backfill will be determined by loading the abutment before and after compacting backfill behind the abutment. As with previous tests, the applied lateral force, abutment displacement and rotation, pressure on the backwall, vertical and horizontal movement of the backfill, and location of the failure surfaces in the backfill will be measured.

Hired through qualifications-based selection in the UDOT General Engineering Services Pool, Research Work Discipline, the Principal Investigator for this study is Dr. Kyle Rollins of Brigham Young University. The technical advisory committee (TAC) for the study currently includes representatives from UT, CA, ID, NY, SC, and WA state DOTs. TAC meetings will be held periodically during the study and are currently planned to be web conferences.

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

Task 1 – 100% complete. A task completion memo was submitted to UDOT.
Task 2 – 10% complete. BYU started field tests at the Salt Lake City airport testing site.
Task 3 – 0% complete.
Task 4 – 0% complete.
Task 5 – 0% complete.
Task 6a – 0% complete.
Task 7a – 0% complete. No TAC meetings were held this quarter.

Contract – BYU provided an updated work plan. UDOT executed the research contract with BYU.

Anticipated work next quarter:

Task 1 – Completed.
Task 2 – Continue and finish the large-scale field tests at the Salt Lake City airport testing site. Submit a memo with preliminary results.
Task 3 – Begin analysis of test results.
Task 4 – No work planned.
Task 5 – No work planned.
Task 6a – No work planned.
Task 7a – Plan to have a TAC update meeting to discuss preliminary results.

Contract – No changes are planned this quarter.

Significant Results:

Task 1 (Analysis of the existing abutment to determine acceptable rotation and loading scheme) was completed. Some of the large-scale field testing was completed at the airport testing site.

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).

The airport testing site had limited availability in 2025 due to a planned construction project unrelated to the research. The BYU research team had some problems getting their hydraulic actuators and pump system operating properly, which delayed completion of the field testing. They eventually got these working well. Fortunately, the airport informed us that their construction project (that would impact the testing site) was delayed and would not start until August 1 instead of June 27. Therefore, the field testing could continue through July.

Potential Implementation:

Based on the previous study results, the skew reduction factor has already been implemented in the Caltrans Seismic Design Criteria, along with geotechnical guidelines for Oregon DOT and UDOT. However, as designers have started applying this approach, several questions have arisen. This new study will address these questions and provide additional design guidance.