Quarterly Progress and Performance Indicators Report:
Project Number and Title: 1-14: Exploring the Safety Impact of Rumble Strips on Prevention of Lane Departure Crashes in Maine
Research Area: Thrust Area 1
PI: Mohammadali Shirazi, Ph.D., Assistant Professor, University of Maine
CO-PI: Per Garder, Ph.D., Professor, University of Maine
Reporting Period: 1/17/2022 to 3/31/2022
Submission Date: 3/31/2022

Overview:

*Provide **BRIEF** highlights of activities performed during the reporting period.*

- We conducted literature review about before/after studies and CMFs developed in other states for rumble strips.
- We explored our data need.
- The grad student studied before/after study methods.

Meeting the Overarching Goals of the Project:

How did the previous items help you achieve the project goals and objects? Please give one bullet point for each bullet point listed above.

- Literature review assist us to refine our approach and methodology.
- The data needed for the analysis were identified.

Accomplishments:

List any accomplishments achieved under the project goals in bullet point form…

- Prepared a first draft of literature review.
- The grad student learned before and after analysis.

Task, Milestone, and Budget Progress:

Complete the following tables to document the work toward each task and budget

Table 1: Task Progress*			
Task Number: Title*	**Start Date**	**End Date**	**% Complete**
1. Literature Review	01/17/2022*	04/30/2022	85%
2. Data Collection	01/01/2022	04/30/2022	30%
3. Preliminary Analysis	05/01/2022	06/30/2022	Not started.
4. Before/After study	07/01/2022	12/31/2022	Not started.
5. Analyzing Results	01/01/2023	02/28/2023	Not started.
6. Benefit/Cost Analysis	03/01/2022	04/30/2023	Not started.
7. Recommendations	05/01/2023	06/30/2023	Not started.
8. Final Report	07/01/2023	08/31/2023	Not started.

*Modified start date of the project due to student's late arrival.

Table 2: Milestone Progress			
Milestone #: Description	**Corresponding Deliverable**	**Start Date**	**End Date**
Literature Review	Summary of Reviewed Studies	01/17/2022*	04/30/2022
Data Collection	Summary Statistics of Uniform Datasets	01/01/2022	04/30/2022
Preliminary Analysis	Summary of Preliminary Analysis	05/01/2022	06/30/2022
Before-and-After Study	Summary of Results	07/01/2022	12/31/2022
Analyzing Results/CMFs	Summary of CMFs	01/01/2023	02/28/2023
Benefit/Cost Ratio Analysis	Benefit-Cost Ratios	03/01/2022	04/30/2023
Recommendations	Summary of Recommendations	05/01/2023	06/31/2023
Final Report	Final Report	07/01/2023	08/31/2023

*Modified start date of the project due to student's late arrival.

Table 3: Budget Progress*		
Project Budget*	**Spend – Project to Date**	**% Project to Date (include the date)**
$117,314.00	$0.00	0% as of 06/01/2022

*This table has been updated to reflect phase 2.

Is your Research Project Applied or Advanced?

☒ **Applied** (*The systematic study to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.)*

☐ **Advanced** *(An intermediate research effort between basic research and applied research. This study bridges basic (study to understand fundamental aspects of phenomena without specific applications in mind) and applied research and includes transformative change rather than incremental advances. The investigation into the use of basic research results to an area of application without a specific problem to resolve.)*

Education and Workforce Development:

Answer the following questions (N/A if there is nothing to report):

1. Did you provide any workforce development or training opportunities to transportation professionals (already in the field)? If so, what was the training? When was it offered? How many people attended? (i.e. The research team provided an in the field training for the SAR technology for 3 maintenance crew members of the MassDOT on 3/31/2021. The members learned how to use the technology and interrupt the data.)

   N/A

2. Did you hold meetings with any transportation industry organizations or DOTs? If so, what was the meeting's purpose? When was it offered? How many people attended? (i.e. The research team held a meeting with MaineDOT to update them on the progress of the research findings and how the findings can be implemented on 3/31/2021. 15 DOT maintenance members were present at the meeting.)

   - We met with the Maine DOT technical campion in January 2022 to start the project.

3. Did you host/participant in any K-12 education outreach activities? If so, what was the activity? What was the target age/grade level of the participants? How many students/teachers attended? When was the activity held? (i.e. 25 8th graders and 2 teachers visited the concrete lab and created small concrete trinkets like Legos on 3/31/2021. They learned about the different types of fibers that can be used in the concrete.)

   N/A

Technology Transfer:
Complete all of the tables below and provide additional information where requested.

Use the table below to complete information about conference sessions, workshops, webinars, seminars, or other events you led/attended where you shared findings as a result of the work you conducted on this project:

Table 4: Presentations at Conferences, Workshops, Seminars, and Other Events					
Type	**Title**	**Citation**	**Event & Intended Audience**	**Location**	**Date(s)**
N/A	N/A	N/A	N/A	N/A	N/A

Use the table below to report any publications, technical reports, peer-reviewed articles, newspaper articles referencing your work, graduate papers, dissertations, etc. written as a result of the work you conducted on this project. Please list only completed items and exclude work in progress.

Table 5: Submitted/Accepted Publications, Technical Reports, Theses, Dissertations, Papers, and Reports				
Type	**Title**	**Citation**	**Date**	**Status**
N/A	N/A	N/A	N/A	N/A

Answer the following questions (N/A if there is nothing to report):

1. Did you deploy any technology during the reporting period through pilot or demonstration studies as a result of this work? If so, what was the technology? When was it deployed?
   N/A

2. Was any technology adopted by industry or transportation agencies as a result of this work? If so, what was the technology? When was is adopted? Who adopted the technology?
   N/A

3. Did findings from this research project result in changing industry or transportation agency practices, decision making, or policies? If so, what was the change? When was the change implemented? Who adopted the change?
   N/A

4. Were any licenses granted to industry as a result of findings from this work? If so, when? To whom was the license granted?
   N/A

5. Were any patent applications submitted as a result of findings from this research? If so, please provide a copy of the patent application with your report.
   N/A

6. Did industry organizations or DOTs provide cost-share (cash or in-kind) to your research during the reporting period? Who was the organization? Please provide an in-kind support invoice from the organization with your report (this is kept confidential and used for record keeping purposes only).
   N/A

Describe any additional activities involving the dissemination of research results not listed above under the following headings:

Outputs:
Definition: Any new or improved process, practice, technology, software, training aid, or other tangible product resulting from research and development activities. They are used to improve the efficiency, effectiveness, and safety of transportation systems. List any outputs accomplished during this reporting period:

- N/A

Outcomes:
Definition: The application of outputs; any changes made to the transportation system, or its regulatory, legislative, or policy framework resulting from research and development activities. List any outcomes accomplished during this reporting period:

- N/A

Impacts:
Definition: The effects of the outcomes on the transportation system such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits. The reported impacts from UTCs are used for the assessment of each UTC and to make a case for Federal funding of research and education by demonstrating the impacts that UTC funding has had on technology and education. NOTE: The U.S. DOT uses this information to assess how the research and education programs (a) improve the operation and safety of the transportation system; (b) increase the body of knowledge and technologies; (c) enlarge the pool of people trained to develop knowledge and utilize technologies; and (d) improves the physical, institutional, and information resources that enable people to have access to training and new technologies. List any outcomes accomplished during this reporting period:

- N/A

Participants and Collaborators:

Use the table below to list individuals (compensated or not) who have worked on the project other than students.

Table 6: Active Principal Investigators, faculty, administrators, and Management Team Members				
Individual Name & Title	**Dates involved**	**Email Address**	**Department**	**Role in Research**
N/A	N/A	N/A	N/A	N/A

*Use the table below to list **all** students who have participated in the project during the reporting period. (This includes all paid, unpaid, intern, independent study, or any other student that participated in this project.) **ALL FIELDS ARE REQUIRED.***

Table 7: Student Participants during the reporting period								
Student Name	**Start Date**	**End Date**	**Advisor**	**Email Address**	**Level**	**Major**	**Funding Source**	**Role in research**
Jhan Kevin Gil-Marin	1/17/2022		Dr. Shirazi		Master Student	Civil Engineering (Transportation)	TIDC	Graduate Research Assistant
Alainie Sawtelle	02/01/2022	03/31/2022	Dr. Shirazi		Master Student	Civil Engineering (Transportation)	PI's start-up	Graduate Research Assistant

Use the table below to list any students who worked on this project and graduated or received a certificate during this reporting period. Include information about the student's accepted employment during the reporting period (i.e. the student is now working at MaineDOT) or if they are continuing their students through an advanced degree (list the degree and where they are attending).

Table 8: Students who Graduated During the Reporting Period			
Student Name	**Degree/Certificate Earned**	**Graduation/Certification Date**	**Did the student enter the transportation field or continue another degree at your university?**
N/A	N/A	N/A	N/A

Use the table below to list any students that participated in Industrial Internships during the reporting period:

Table 9: Industrial Internships			
Student Name	**Degree/Certificate Earned**	**Graduation/Certification Date**	**Did the student enter the transportation field or continue another degree at your university?**
N/A	N/A	N/A	N/A

*Use the table below to list **organizations** that have been involved as partners on this project and their contribution to the project during the reporting period.*

Table 10: Research Project Collaborators during the reporting period						
Organization	**Location**	**Contribution to the Project**				
		Financial Support	**In-Kind Support**	**Facilities**	**Collaborative Research**	**Personnel Exchanges**
Maine Department of Transportation (Maine DOT)	Augusta, ME	X			X	

*Use the table below to list **individuals** that have been involved as partners on this project and their contribution to the project during the reporting period. (**List your technical champion(s) in this table.** This also includes collaborations within the lead or partner universities who are not already listed as PIs; especially interdepartmental or interdisciplinary collaborations.)*

Table 11: Other Collaborators				
Collaborator Name and Title	**Contact Information**	**Organization and Department**	**Date(s) Involved**	**Contribution to Research**
Mr. Robert A Skehan		Maine DOT	01/ 17/ 2022	Technical Champion

Use the following table to list any transportation related course that were taught or led by researchers associated with this research project during the reporting period:

Table 12: Course List

Course Code	Course Title	Level	University	Professor	Semester	# of Students
CE 225	Transportation Engineering	Undergrad	UMaine	Dr. Shirazi	Spring 2022	56
CIE 598	Advanced Transportation Planning	Grad	UMaine	Dr. Shirazi	Spring 2022	5

Changes:

- We modified the start date of the project due to student's late arrival.

Planned Activities:

- Collecting data
- Start Preliminary analysis.